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THE JEWISH AGENCY AND THE AMERICAN FUND FOR ISRAEL INSTITUTIONS
FOUNDED BY A. REIFENBERG

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THIS JOURNAL *publishes (in the original English or French, or in translation from Hebrew) papers from contributors in Israel and other countries on the following subjects: ancient—especially biblical—history and archaeology; the history and archaeology of later periods; the geography, geology, soil science and natural history of Israel and the Near East.*—The Editors are not responsible for opinions expressed by contributors.

Israel Exploration Journal

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The Earliest Record of Egypt's Military Penetration into Asia?*

Some Aspects of the Narmer Palette, the 'Desert Kites' and Mesopotamian Seal Cylinders

YIGAEL YADIN

Hebrew University, Jerusalem

THE famous slate-palette of Narmer[1] has remained, since its discovery in Hierakonpolis by Quibell over fifty years ago,[2] one of the most important documents from the very beginning of recorded history in Egypt.[3]

The importance of the palette, in so far as the present study is concerned,[4] lies mainly in two facts:

(a) '... It seems to be a concrete record of the unification of Egypt, or at least of an important stage in its realization';[5] King Narmer is clearly depicted on the palette as the ruler of both Upper and Lower Egypt (the marshlands of the Delta included), and thus, as most scholars agree, has the best claim to

* The essence of the first part of this paper was read at the 23rd International Congress of Orientalists, at Cambridge, England, in August 1954, under the title: Military Contacts between Palestine and Egypt at the Beginning of the Third Millennium B.C.

[1] For some bibliographical notes dealing with the palette, see J. Vandier: *Manuel d' archéologie égyptienne*, I. Paris, 1952, p. 595, n.3.

[2] J. E. Quibell (with notes by W. M. F. Petrie): *Hierakonpolis, I, Plates of Discoveries in 1898*. London, 1900, Pl. XXIX and p. 10.

[3] See Vandier, *op. cit.* (supra, n.1), p. 599; cf. also H. Ranke: Eine Bemerkung zur 'Narmer' Palette, *Studia Orientalia*, 1, 1925, pp. 167 ff.

[4] On the significance of the palette for the study of art-history, see H.A. Groenewegen–Frankfort: *Arrest and Movement*. London and Chicago, 1951, pp. 20-23.

[5] H. Frankfort: *The Birth of Civilisation in the Near East*. London, 1951, p. 78.

be identical with the legendary Menes who, according to tradition, was the first king of Unified Egypt.

(b) It is a very important landmark in the history of writing in Egypt, presenting simultaneously three different—although related—methods of describing events and ideas:

(1) A pictorial representation of the event.

(2) Pictographic signs representing symbolically the nature and character of the subjects depicted in the composition.

(3) True hieroglyphic signs.[6]

When the author took the liberty of entering into the 'Holy of Holies' of Egyptian archaeology, he was prompted by the fact that Egyptologists had been unsuccessful in their attempts to decipher the nature and meaning of one of the pictographic signs—namely, the scene of the lower field of the reverse of the palette—by means of known hieroglyphic signs or from their knowledge of Egyptian scenery and modes of life.[7]

The validity of the unproven supposition that *all* the scenes which appear on the palette are connected in one way or another with the main theme of unification of the two parts of Egypt, could be accepted unequivocally only if all the scenes and signs had been fully understood and deciphered in the light of the Egyptian milieu. As this goal had not yet been reached, it seemed worthwhile to probe and look for a possible solution—at least for the above mentioned part of the palette—in an area outside Egypt.

Before analysing that part which is the first subject of the present study, it is desirable to recapitulate briefly the main scenes represented on both sides of the palette.

Both faces are divided by the artist into several fields by means of horizontal lines, the *obverse* into four fields and the *reverse* into three (Pl. 1A, B). Each field—although composed of a number of pictures or scenes—is clearly dedicated to the description of one subject only.

The upper fields which are the smallest, are identical on both sides and show in the middle the name of king Narmer[8] flanked on both sides by the head of

[6] Cf. A.H.Gardiner: The Nature and Development of the Egyptian Hieroglyphic Writing, *Journal of Egyptian Archaeology*, 2, 1915, pp. 61-75; S. Schott: Kulturprobleme der Frühzeit Ägyptens, *Mitteilungen der Deutschen Orient-Gesellschaft*, 84, 1952, pp. 14 ff.

[7] Vandier, *op. cit.* (supra, n. 1), p. 597.

[8] On the possibility of reading it as Merinar, see Vandier, *op. cit.* (supra, n. 1), p. 595, n. 3.

Hathor. In the second field of the *obverse,*[9] Narmer, wearing the crown of Lower Egypt and preceded by standards of the gods, is inspecting a number of beheaded enemies.

The next field, the largest, is occupied by two serpent-necked lions (or panthers) to whose intertwined necks are attached strings held by two men. This motif, which is at home in Mesopotamia, has been interpreted in different ways.[10] In the lower field, one can see a bull—which symbolizes the king—breaking its way into a fortified enclosure and trampling on a prostrate naked enemy very clearly non-Egyptian in character. Inside the enclosure one can recognize a trapezoid sign, the nature of which has not been ascertained.[11]

Let us turn now to the *reverse* of the palette. The main area is occupied by the middle field which contains what is considered to be the most important part of the palette. Narmer—now wearing the crown of Upper Egypt—is seen clubbing a grovelling chieftain of a nome in Lower Egypt—'The Nome of the Harpoon'—as understood by some scholars.[12]

Above the kneeling chieftain, there is a group of symbolic pictographs, showing the Falcon-Horus dominating an enemy whose land is symbolized by a group of six papyrus stalks, i.e. 'The Land of the Papyrus', which is the Delta of Lower Egypt. This interpretation—suggested by Ranke,[13] who rejected the previous one which saw in the above a lotus-plant, and thus understood the six stalks to denote the number 6000[14]—is important to our present discussion in showing that the palette-artist indicated the identity of enemy countries by depicting characteristic objects, plants or buildings.

The lowest field of the reverse is clearly separated from the one above by a horizontal line, and is thus dedicated to another subject. The whole field is occupied by the figures of two men, who differ from the figures of the middle field by their long hair and completely naked bodies.

The two men are presented in a peculiar position and appear to be running away. This curious treatment has led scholars to describe them in different ways, either as 'slain',[15] 'seeking fortress protection',[16] or more recently by

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[9] For a detailed study of this side of the palette, see Schott, *op. cit.* (supra, n. 6), pp. 22 ff.
[10] See infra, p. 12 ff. [11] See infra, p. 11 f. [12] See Vandier, *op. cit.* (supra, n. 1), p. 596, and Schott, *op. cit.* (supra, n. 6), p. 21. [13] See supra, n. 3.
[14] Cf. Gardiner, *op. cit.* (supra, n. 6), p. 72 [15] Quibell, *op. cit.* (supra, n. 2), p. 10.
[16] L.W. King & H. R. Hall: *Egypt and Western Asia.* London, 1910, p. 48.

Vandier, as 'un peu comme s'ils nageaient', but 'en réalité on doit se les figurer étendus sur le côté et probablement sur le point de mourir'.[17] Vandier sums up his description by saying: 'Les signes hiéroglyphiques gravés au-dessus d'eux indiquaient sans doute leur pays d'origine, mais ces signes, à notre connaissance, n'ont pas été déchiffrés'.

Although the sign on the left side is recognized by all who have dealt with the subject to represent the plan of a rectangular fortress or a fortified enclosure, no one has been able to identify definitely the enemy below it.[18]

As for the sign which is above the man on the right, no solution has been found even to its nature.[19] From the fact that no exact parallel is known to it among the true hieroglyphic signs,[20] and from what one can infer from the artist's method in indicating the identity of some of the other enemies depicted on the palette, we may, it seems, conclude that both signs are in fact merely pictures of buildings or enclosures characteristic of the lands of the two enemies and thus indicate their nationality.

The enclosure on the right side—if it is indeed an enclosure, as one may suggest—is composed of two different elements: (a) a semi-circular construction, from which (b) two very long walls spread out fanwise embracing a segment of about 30° (Pl. 1 C).

While the two walls have no bastions or crenellation, it seems as if the artist emphasized the different construction of the wall of the semi-circular enclosure by engraving on it many tiny lines.

And lastly, there appears to be no entrance to the building except through the converging long walls. While the plan of the fortress on the left is relatively common in the Near East, and could not, on its own, help us directly to identify the enemy below it, the unique shape of the other building,[21] just

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[17] Vandier, *op. cit.* (supra, n. 1), p. 597.

[18] On the suggestion of Schott, see the following note.

[19] Schott's latest interpretation, *op. cit.* (supra, n. 6), p. 21, of the two signs, taking the scene on the lower field to be a part of the whole theme of unification, is as follows: 'Memphis, die in das Niltal vorgeschobene "Festung" und ein anderer, vielleicht lediglich als "unterlegen" oder "ausgerupft" bezeichneter Gau, liegen schon erschlagen, "unter den Füssen seiner Majestät" '.

[20] I take this opportunity to thank both Prof. Polotzky, Hebrew University, Jerusalem, and Prof. Wilson, University of Chicago, for their verbal confirmation of the above statement.

[21] There is indeed no similarity between the shape of this enclosure and an engraving of a façade of a fortified tower (or perhaps a silo?)—and an ivory model thereof—which have been found in Egypt (for a drawing see Vandier, *op.cit.* [supra, n. 1], p. 844, Fig. 546). What gives them at first

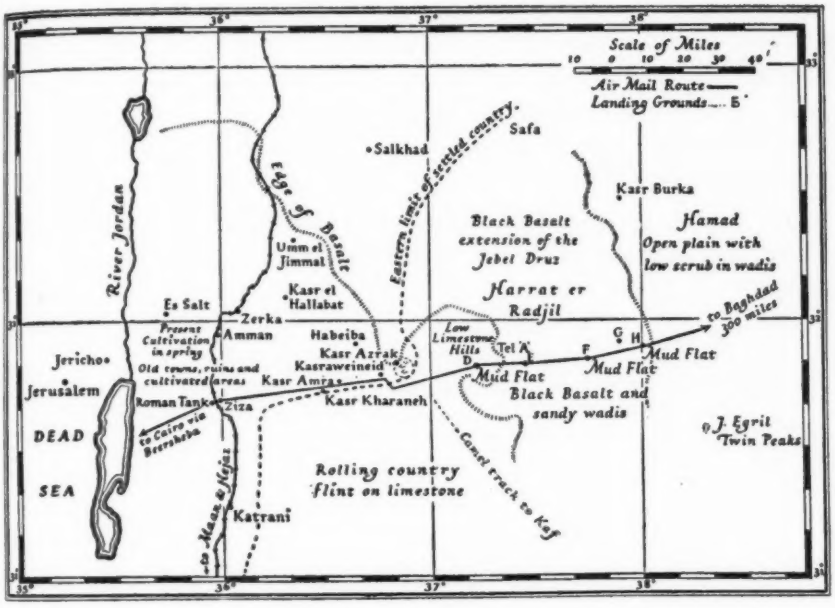

Fig. 1.

described, should help us in the identification of the other enemy, if we could only find a parallel to it.

In what follows, such a parallel is suggested.

At the end of 1929, Group-Captain Rees, of the Royal Air Force, announced the discovery,[22] through air-observations and photographs, in the desert area which lies to the east of the cultivated areas of Trans-Jordan, of a great number of curiously shaped stone-built constructions. They were called 'kites', because their shape when seen from the air resembled a child's kite. Some of the so-called 'kites', lie in the steppe desert or el-Ḥamâd, but they occur in greatest profusion

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glance a superficial similarity of structure is a very clearly marked ladder, leading to the opening on top, to say nothing of the fact that the plan of the building is a closed circle.—I thank Mrs. Ruth B.K. Amiran for drawing my attention to the above towers.

[22] L.W.B. Rees: The Trans-Jordan Desert, *Antiquity*, 3, 1929, pp. 389-407. In fact, the credit for their discovery should go to Flight-Lieutenant Maitland of the R.A.F. who dealt with this subject in his article: The "Works of the Old Men" in Arabia, *Antiquity*, 1, 1927, pp. 197-203 and Pl. III.

in the lava belt south and south-east of the Jebel Druze. Roughly speaking, the structures are scattered in the area east and north-east of Amman — a great number of them near the route leading to Baghdad[23] (see map, Fig. 1).

The great number of these constructions may be judged from Rees' statement that he observed at least three big groups or chains of these 'kites' — each 'some twenty miles or so in length' (p. 397).

The following descriptions and pictures are based on Rees' detailed study, which is accompanied by a great number of sketches and photographs, as well as on the subsequent additional observations and sketches by A.S. Kirkbride:[24]

Fig. 2.

'These structures consist of enclosures of irregular shape, usually from thirty to forty metres across, with two long walls sometimes 400 metres in length...' '...The only entrances to the enclosure were at the point where the two outer walls converged and joined their fabric; these gateways were from two to three metres broad'[25] (Fig. 2).

The shape of the enclosures proper varies from a triangle to a semi-circle or to a polygon (Figs. 3,4,5).

The interesting feature of the construction of these enclosures which made it possible to ascertain the function of the whole system, has been described by Kirkbride: 'The walls of the enclosure itself included a number of lesser enclosures or "nests" which were clearly designed for the defence of the building from external attack'[26] (Fig.6). In other words: while the long converging walls were without bastions or towers except sometimes at their extreme ends, which caused them to thicken at these points,[27] the enclosure itself is distinguished by those 'nests', which although they were different from the ordinary towers served the same purpose. Before drawing the

[23] See Fig. 1 in Rees' article as well as R. Dussaud: Les relevés du Capitain Rees dans le désert de Syrie, *Syria*, 10, 1929, pp. 144-163: in particular Fig. 1 on p. 145 and Fig. 2 on p. 146. See also the map in Maitland's article, *op. cit.* (supra, n. 22), p. 199.

[24] A.S. Kirkbride: Desert 'Kites', *JPOS*, 20, 1946, pp. 1-5.

[25] Kirkbride, *ibid.*, p. 1. Rees observed that their length sometimes reaches 1000 yards, see *op. cit.* (supra, n. 22), p. 396.

[26] *Ibid.*, p. 2. These 'nests' are clearly seen also in the photograph printed on Pl. III in Maitland's article where the enclosure has a shape of a perfect semicircle.

[27] Rees, *op. cit.* (supra, n. 22), p. 397.

Fig. 3.

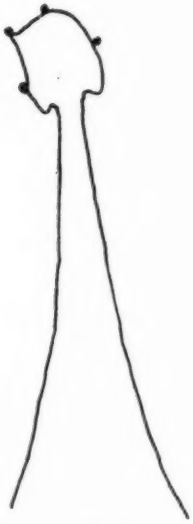

Fig. 4.

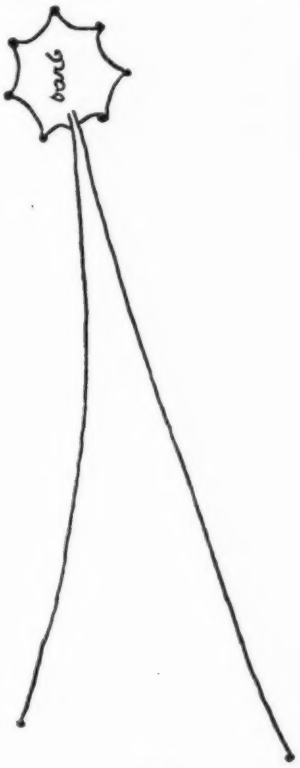

Fig. 5.

conclusion that the enclosure depicted on the Narmer palette should be- iden tified with these constructions because of the striking similarity between them, even in details, and that the vanquished man depicted below the sign indeed represents the subjugation of the people who occupied these constructions, we should verify three additional points: the function of the constructions, the archaeological evidence for their dating, and the possibility of their occurrence in other areas.

Fig. 6.

Rees and Kirkbride, elaborating on the theory suggested by Maitland (p. 202), defined the function of these constructions as follows: 'When raiders were known to be in the field, the herds were grazed in the near vicinity of the "kites"; in extreme cases, actually in the wadi beds covered

by the walls. Each enclosure was garrisoned by a few fighting men and the shepherds themselves maintained positions from which they could stampede the animals into the mouth of the funnel, as it were, after which the outer walls would guide the frightened animals into the enclosure. Once in the enclosure the animals could be retained by a single man at the gateway or possibly by a hastily erected barrier of boulders. They could thus be brought to relative safety in the shortest possible time, and with little danger, thanks to the converging outer walls, of their running in the wrong direction'.[28]

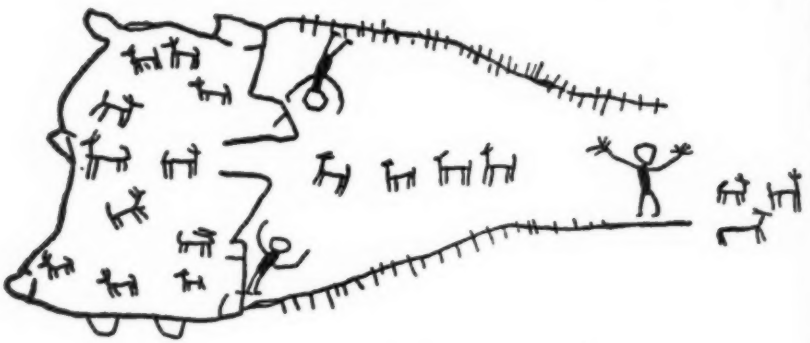

Fig. 7.

It was, by the way, this theory and the shape of the constructions which led Eissfeldt to suggest their identification with the biblical מִשְׁפְּתַיִם in the Song of Deborah (Judges v, 16; AV: 'sheep-folds'), and in Gen. xlix, 14 (AV: 'burdens'), concerning Reuben and Issachar respectively.[29]

The suggestions of Maitland, Rees and Kirkbride have very recently received a striking confirmation in a Safaitic drawing scratched on a stone, which was discovered by Lankester Harding in a cairn built over a Safaitic grave, about 15 km. east of the I.P.C.'s pumping station H5 and only 50 metres from the main Baghdad road.[30] This picture, crude as it is in execution, emphasizes the

[28] Kirkbride, *op. cit.* (supra, n. 24), p. 3.

[29] O. Eissfeldt: Gabelhürden im Ostjordanland, *Forschungen und Fortschritte*, 25, 1949, pp. 9-10. It seems to me that this ingenious suggestion should be further studied both from the topographical and philological aspects. On the משפתים see most recently W.F. Albright: A Catalogue of Early Hebrew Lyric Poems, *Hebr. Union Coll. Ann.*, 23, 1950-1951, p. 22.

[30] G. L. Harding & W.L. Read: Archaeological News from Jordan, *BA*, 16, 1953, p. 5, Fig. 3, and *The Illustrated London News*, No. 5973, 10.10.1953, pp. 564-565 and Fig. 8. See also *Biblica*, 35, 1954, pp. 400-401 and Figs. 1,2. Harding's detailed description has now been published by him in the

main characteristics of the construction and its functions, at least in the Safaitic period (Fig. 7). Harding's conclusion that this discovery 'answers the two outstanding questions about these structures as to their date and method of use'[31] has been challenged most recently by Eissfeldt,[32] who maintains, rightly, that the only conclusion one can draw from this evidence is that these structures were still in use—or were reused—in the Safaitic period.[33]

The circumstantial archaeological evidence for the dating of these 'kites' is very scanty indeed. One should mention perhaps that Rees, observing that the black colour of the 'kite' stones is in contrast to the red colour of the Safaitic buildings in the same area, comes to the conclusion that they were very much older than the Safaitic buildings (pp. 395, 400); in fact, he suggests that they are pre-Roman (p. 398). Kirkbride summed up his own observations and deductions as follows: 'I suggest therefore that the "kites" date from before the coming of the Nabataeans. Further than that, I cannot go' (p. 4). Dussaud's[34] suggestion that, in order to fix the age of the complex, one should study the nature of the flints (which according to Rees are abundant in the whole area), indicates his surmise that these buildings are much older than either Rees or Kirkbride had dared to suggest.

Thus we see that the archaeological evidence, although definite in dating the 'kites' to the pre-Safaitic period, does not enable us to come to a firm conclusion concerning the date when these unique structures were established. Lastly, one should mention the fact that both Rees—with the help of an extensive survey from the air (p. 399)—and Kirkbride (p. 5) emphasize that nowhere else in Southern Trans-Jordan and nowhere in the Arabian peninsula are any similar structures to be found. And as far as our knowledge goes, nothing of the kind has been discovered anywhere else in Asia or Africa.

The above-mentioned facts, together with the shape of these 'kites' enable us to conclude that this part of the palette records the subjugation of the region

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Annual of the Department of Antiquities of Jordan, 2, 1954, pp. 30-31. The parts of the report concerning our subject are also reprinted in *Antiquity*, 28, 1954, pp. 165-167.

[31] *BA*, p. 6; *Illustrated London News*, (supra, n. 30), p. 564 and similarly in his latest report mentioned in n. 30.

[32] *Forschungen und Fortschritte*, 28, 1954, p. 56.

[33] The accompanying inscription: 'By Mani'at, and he built for Hani—And he drew a picture of the pen (or enclosure) and the animals pasturing by themselves', merely informs us that Mani'at took part in the building of the *cairn* and was the 'artist' responsible for the drawing on the stone. Similarly the names of other artists are mentioned on other inscriptions from the same cairn.

[34] *Op. cit.* (supra, n. 23), p. 151.

which lies near the highway between Trans-Jordan, Syria and Mesopotamia: the land of the 'kites'.

If this is the correct solution to the identity of the enemy on the right hand side of the palette, it is very tempting to suggest the identification of the country of the enemy on the left, whose country is represented by a very clear fortified city or fortress: namely, the area of Palestine already highly fortified in this period.

In this case the lower field of the palette records Narmer's domination of the two main highways between Egypt, Syria and Mesopotamia: the 'sea road' and the 'king's way'. The former cuts its way through the most fortified part of Palestine,[35] the latter through the less inhabited and much less fortified plateau of Trans-Jordan.[36]

For an Egyptian proceeding through these twin highways towards Syria and Mesopotamia, the 'sea road' lies on the left, the 'king's way' on the right.

Let us summarize the main points reached concerning this part of the palette, and their possible bearing on the various subjects:

(1) The date of the 'kites' should be pushed back to at least the beginning of the third millennium B.C. and possibly to the latter half of the fourth millennium.

(2) The lower field of the reverse of Narmer's slate-palette records Egypt's military penetration into Trans-Jordan and possibly Palestine.

(3) This conclusion, if accepted, will explain the Semitic features of the two figures—noticed already by many scholars[37]—without necessarily implying a Semitic domination of the Delta.[38]

This interpretation suggests that *not all* of the scenes depicted on the palette are dedicated to the unification of the Nile Valley; in other words, it seems

[35] See A.H. Gardiner: The Ancient Military Road between Egypt and Palestine, *Journal of Egyptian Archaeology*, 7, 1920, pp. 99 ff.

[36] See Albright's note to N. Glueck: Three Israelite Towns in the Jordan Valley, *BASOR*, 90, 1943, p. 17, n. 77a; B. Maisler: Palestine at the Time of the Middle Kingdom in Egypt, *Bulletin des études historiques juives*, 1, 1946, pp. 34-35, especially p. 35, n. 1; see also Exodus xiii, 17-18.

[37] C. G. Seligman: Ethnic Relationship of the Vanquished Represented on Certain Proto-Dynastic Egyptian Palettes, *Annals of Archaeology*, 7, 1914-1916, p. 48, and see the beginning of the next note.

[38] See for example, King & Hall, *op. cit.* (supra, n. 16), pp. 47-48. On this subject see Albright's most interesting remarks in *From the Stone Age to Christianity*, 2nd ed. Baltimore, 1946, p. 114. See infra at the end of n. 64.

that this votive slate-palette records the victories and achievement of Narmer, *including* the unification of Egypt depicted in the central field mentioned above. In that case it should stimulate us to further studies in the interpretation of the scenes on the *obverse* of the palette, particularly the scene on the lower field and perhaps that on the central field as well.

While the identification of the scene in the lower field discussed above seems reasonably certain, in what follows the element of conjecture dominates the discussion. Nevertheless, it seems worthwhile to offer some new suggestions, since the interpretations hitherto given to these scenes by scholars who

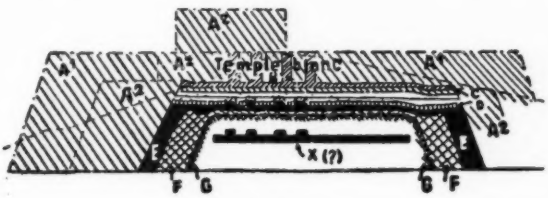

Fig. 8.

have dealt with the palette are based on the unification theme alone and are equally conjectural, in many cases offering no solution at all.

As mentioned above, the features of the enemy trampled by the bull are clearly different from those of the Egyptians depicted in the central field of the reverse. The city of the defeated men is depicted as well-fortified, and its main feature is a dominating building, trapezoid in shape with perpendicular 'columns', on its upper plateau.

The suggestion that this building represents a tent or a hut[39] is hardly acceptable, because—as shown above—the purpose of these signs or pictures is clearly to signify the identity of the enemy or his country.

Now, it seems to me that there is one type of building from that period, which answers all the characteristics of the construction under discussion, and would at the same time be typical of one country alone; namely, the *ziggurat* of the type of the famous so-called 'Anu ziggurat' from Warka.[40] This type of ziggurat was not 'as we know that architectural form in later times—that is a step-tower—but through most of its history was merely a high platform on

[39] For example, King & Hall, *op. cit.* (supra, n. 16), p. 48.
[40] See A. Parrot: *Ziggurat et tour de Babel.* Paris, 1949, pp. 114 ff., and Figs. 71-72 on p. 116.

which a temple was placed'[41] (Fig. 8). Most typical of that ziggurat are its clearly sloping sides,[42] identical with those depicted on the palette. The identification of the structure with a ziggurat seems to explain the nature of the two perpendicular 'columns' depicted above the building in the palette: they are the columns, standards, or horns which were erected at the top corners of the ziggurat, similarly depicted on some representations of ziggurats.[43] The fact that no stairways are shown should not be taken as a proof against such an identification, for, curiously enough, this is the case in many representations of the ziggurat in Mesopotamia.[44] Thus the whole composition—the features of the dying man, the walled city and the trapezoid structure dominating its centre with the 'standards' on top of it—could convey very clearly the identity of the country of the enemy.

Finally we come to the scene depicted in the central field—which is the largest—of the obverse. The whole field is occupied by two serpent-necked lions (or panthers) to whose intertwined necks are attached strings held by two men. This important scene, also, has not been adequately interpreted by those who saw in all the scenes reference to the unification of Egypt. Petrie[45] was satisfied with the remark that this scene 'is probably emblematic of the subjugation of some tribe'; Vandier,[46] summing up the problem most recently, has hesitated to offer any interpretations at all. Schott—strictly adhering to the unification theme—has offered the following interpretation:[47] 'Sie stehen hier als Symbol für die Beendigung des Streites. Gebändigt, an den Stricken (fremdländischer) Wärter, verschlingen sie ihre Hälse ineinander—das Motiv, das ornamental auf Siegelzylindern von Uruk erscheint—und beriechen oder 'küssen' sich, was altägyptisch zugleich "Verbrüderung" bedeutet. Der Streit ist beendet. Die Kampfmächte selbst feiern die Vereinigung der beiden zwischen den Wüsten am Strom zusammengeschlossenen Länder.'

It seems to me that there are two main difficulties in the above interpretation:

[41] Ann L. Perkins: *The Comparative Archeology of Early Mesopotamia*. Chicago, 1949, p. 110. See there for further bibliography.

[42] On the problem of the 'sloping' ziggurats, see in particular T. Dombart: Zur Frage der Böschung am Babel-Turm, *Archiv für Orientforschung*, 7, 1931-32, pp. 251 ff.

[43] See Edith Porada: An Unknown Representation of a Ziggurat, *BASOR*, 99, 1945, pp. 18 ff., and Fig. 2 on p. 19. See also Parrot, *op. cit.* (supra, n. 40), Figs. 4, 15, 17, 18 and p. 45. See also W. F. Albright: *Archaeology and the Religion of Israel*. Baltimore, 1942, p. 152.

[44] See Porada, *op. cit.* (supra, n. 43), p. 20.

[45] *Op. cit.* (supra, n. 2), p. 10.

[46] *Op. cit.* (supra, n. 1), p. 598.

[47] *Op. cit.* (supra, n. 6), p. 25

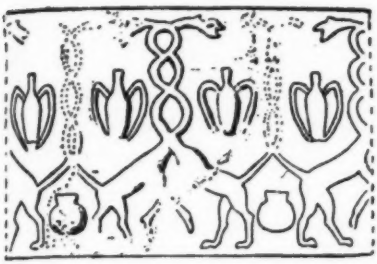

Fig. 9.

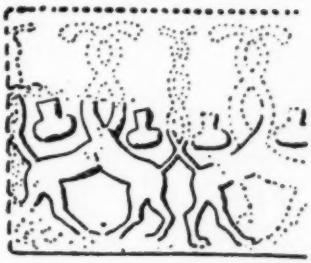

Fig. 10.

(1) As it is clear that the main motif is Mesopotamian in origin and character (see below), it is very strange that the artist should choose it—and clearly not as an ornament only—for a theme symbolizing the end of the war between the two parts of Egypt, as suggested by Schott.

(2) The strings attached to the serpent-like necks of the animals seem to indicate a state of subjugation, as Schott points out with reference to the string in the central field of the reverse,[48] and this surely does not point to a state of 'Verbrüderung'.

The clear fact that the motif is Mesopotamian in origin, and is a typical feature in many of the seals and seal-impressions in Warka[49] (Figs. 9, 10), compels us to examine its nature in the Mesopotamian milieu before trying to understand its symbolic meaning on the Narmer palette.

Scholars who have studied the meaning of these entwined animals in Mesopotamia have come to no definite conclusion, although the animals' possible mythological meaning has been stressed.[50]

This motif is very similar to another rather common in the same milieu—and perhaps even its forerunner—i. e. a pair of intertwined snakes which appears in Egypt too as an import from Mesopotamia.[51] The similarity,

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[48] 'Der Strick steht als Schriftbild des Wortes "nehmen"'. *Op. cit.* (supra, n. 6), p. 21.

[49] See E. Schott in *Uruk, Vorläufiger Bericht,* V. Berlin, 1934, pp. 42 ff. and particularly H. Frankfort: *Cylinder Seals.* London, 1939, Pl. IV and p. 27 and *idem, op. cit.* (supra, n. 5), Pl. X, Fig. 16 and p. 109.

[50] 'The precise meaning of the snake-necked monsters... is not known. In contemporaneous seal designs they appear in what seem to be merely ornamental motifs. However it is reasonable to believe that these strange creatures originally had some mythological significance' (Edith Porada: *Corpus of Ancient Near Eastern Seals in North American Collections,* I. Washington, D. C., 1948, p. 2. See also A. Moortgat: *Die Entstehung der sumerischen Hochkultur.* Leipzig, 1945, pp. 71-72; Frankfort, *op. cit.* (supra, n. 49), pp. 20, 27.

[51] On the famous gold-foil handle of the flint knife from Jebel et-Tarif; Frankfort, *op. cit.* (supra, n. 5), Pl. XXI, Fig. 41; Vandier, *op. cit.* (supra, n. 1), Fig. 366, p. 547.

or shall we say the symbolical identity between these two motifs is clearly stressed by the shape of the intertwined necks, which sometimes form three loops, as in the case of the intertwined snakes, and particularly by the fact that the entwined snakes have 'sometimes ears as if they were lion-headed',[52] and the heads of the serpent-necked felines are represented 'either with a serpent's head or with that of a lioness or panther'.[53]

The above-mentioned evidence shows that these motifs in Mesopotamia cannot be understood only ornamentally; they must symbolize a very important feature in the life of the early inhabitants of this region.

While it has been recognized that these early representations of intertwined snakes are the forerunners of the symbol of the god of fertility[54] in later periods, it is more important for our present purpose, to establish the symbolic meaning of these intertwined snakes for the early inhabitants of lower Mesopotamia.

It seems that the following conjecture merits consideration: namely, that they represent or symbolize the most important feature of that land, the two rivers, Euphrates and Tigris.

'Nothing is more common than to compare a meandering stream to the sinuous folds of a snake'[55] and—to continue the same trend of thought—it is very natural to represent the two meandering rivers of Mesopotamia by two snakes, or snakelike creatures.

In that case the motif on the Narmer palette would greatly resemble the frequent representation in Mesopotamian art of a god with meandering rivers (two or four) flowing from a vase, held by some scholars to represent the Tigris and the Euphrates.[56]

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[52] Frankfort, *op. cit.* (supra, n. 49), p. 71: 'The resemblance to the serpent-necked felines (Pls. IV d, f; V, h) seems to have more than a merely decorative significance'.

[53] Frankfort, *op. cit.* (supra, n. 49), p. 27.

[54] *Ibid.*, p. 71. The following quotation from E. Douglas van Buren's article: Mesopotamian Fauna in the Light of the Monuments, *Archiv für Orientforschung*, 11, 1936-1937, p. 1, is of interest to our discussion: 'On cylinder seals and especially on stamp-seals representations of snakes go back to remote ages. It is not always easy to understand why they were chosen, and as a rule their presence does not seem to have had any hostile significance for human beings, but rather to have an *omen of fertility and prosperity* (the italics are mine. Y. Y.) just as Gudea says that muš-da-ma, the Wise Serpent which produces the harvest, he brought from the temple'.

[55] W. F. Albright: The Mouth of the Rivers, *American Journal of Semitic Languages and Literatures*, 35, 1919, p. 168. See there for further examples and detailed discussion of this statement.

[56] See E. Douglas van Buren: *The Flowing Vase and the God with Streams*. Berlin, 1933, p. 3 and n. 3. See also in the index p. 145 *s.v.* Serpent, and its occasional appearance on the monuments depicting the above mentioned theme.

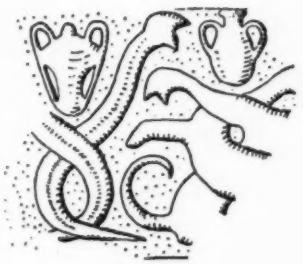

Fig. 11.

This suggested interpretation of the motif will perhaps explain the apparently strange fact of the amphorae and vases repeatedly depicted on the seals of Warka, together with both the serpent-necked creatures[57] (Figs. 9, 10) and the snakes themselves[58] (Fig. 11). It is hardly possible to accept the view that the sole function of their appearance on the seals is as 'space-filling motifs between the main groups',[59] since the vase is most clearly and paramountly connected with[60] the sources of the rivers and symbolizes them.[61] It seems, therefore, that the two intertwined snakes or snake-like creatures — in conjunction usually with the 'determinative' character of the vases — represent the Tigris and Euphrates, prime sources of the prosperity and fertility of Mesopotamia.[62]

Let us come back to the scene on the Narmer palette, where the entwined serpent-necked lions — in clearly subjugated position — occupy the most important part of this side of the palette. Whether this motif was in fact considered by the Mesopotamians to represent the two rivers or not, it was definitely and consciously borrowed by the Egyptians from Mesopotamia, and might therefore have been easily associated by the onlooker with that country.

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[57] See supra, n. 49, as well as Fig. 76 on p. 241 in A. Parrot: *Archéologie mésopotamienne*, II. Paris, 1953, and H. J. Lenzen: Die Tempel der Schicht Archaisch IV in Uruk, *Zeitschrift für Assyriologie*, (NF) 15, 1950, pp. 1 ff., and Pl. 4, Figs. 9, 11.

[58] See the less frequently reproduced impression in *Uruk. Vorläufiger Bericht*, XI. Berlin, 1938, Pl. 30, Fig. i. This is a very important seal impression, as it represents entwined snakes clearly associated with the same types of amphorae and vases as are depicted on the 'entwined lions' impressions.

[59] Frankfort, *op. cit.* (supra, n. 49), p. 25.

[60] Douglas van Buren, *op. cit.* (supra, n. 56), *s.v.* Vase in the index.

[61] Albright, *op. cit.* (supra, n. 55), p. 173: 'Art and mythology pictured the sources as springing from a vase or vases...' and the discussion of the whole subject there.

[62] This suggestion, it seems, is strengthened by a depiction on a steatite vase, discovered at Khafayeh (*Brit. Museum Quart.*, 11, Pl. 32) and most recently republished and discussed by H. Frankfort in his latest book: *The Art and Architecture of the Ancient Orient* (Penguin Books, 1954, p. 19, Fig. 9, and Pl. 11 B). Frankfort writes *inter alia* about the decoration of the vase: 'A long-nosed, long-haired Sumerian figure is seated upon two humped bulls... From the hands of this personage *flow two streams of water*... In another group the same (or a similar) personage appears standing between, or upon, *two panthers, ... this time the hands grasp* (two, *Y. Y.*) *snakes*. They possibly symbolize the fertility of the earth, balancing the fertilizing power of water in the other group. But this is a mere hypothesis'... (The italics are mine, Y. Y.) In the light of the present discussion, however, it seems that both themes are in fact symbolically identical and interchangeable, and represent the two rivers.

Whether these scenes — depicting the subjugation of the peoples of Palestine, Trans-Jordan and Mesopotamia — should be taken as unequivocal evidence that such events occurred, is another problem. In the typically boasting manner encountered later in many Egyptian documents, it might echo only a short penetration, a military expedition or perhaps an even less conspicuous event.

On the other hand, by supplying recorded evidence from the very beginning of the First Dynasty — earlier than any other recorded evidence from Egyptian sources[63] — of some kind of Egyptian penetration into those regions, the Narmer palette may contribute to solving one or more of the difficult problems connected with the known cultural and material contact between Egypt, Palestine and Mesopotamia at the end of the fourth millennium and the beginning of the third millennium B.C.[64]

Acknowledgement. — The illustrations in this article are reproduced from the following sources by kind permission of the publishers:

Plate 1: H. Frankfort: *The Birth of Civilisation in the Near East.* Pls. 16, 17. London: Williams & Norgate, Ltd., 1951.
Fig. 1: *Antiquity*, 3, 1929, p. 390.
Fig. 2: *JPOS*, 20, 1946, p. 1.
Fig. 3: *Biblica*, 35, 1954, p. 400, Fig. 1.
Figs. 4, 5: *Antiquity*, 3, 1929, pp. 396-7.
Fig. 6: *JPOS*, 20, 1946, p. 2.
Fig. 7: *Biblica*, 35, 1954, p. 400, Fig. 2.
Fig. 8: A. Parrot: *Ziggurats et tour de Babel.* Fig. 71. Paris: Editions Albin Michel, 1949.
Figs. 9, 10: *Zeitschrift für Assyriologie* (NF), 15, 1950. Pl. 4, Figs, 9, 11.
Fig. 11: *Abhandl. Preuss. Akad. d. Wiss., Phil.-hist. Kl.*, 11. Berlin, 1938, Pl. 30, i.

[63] For those see J. A. Wilson: Egyptian Historical Texts, apud J. B. Pritchard, edit.: *Ancient Near Eastern Texts.* Princeton, 1950, pp. 227-228.

[64] On these problems see *inter alia*, Frankfort, *op. cit.* (supra, n. 5), pp. 100 ff., and particularly p. 110; Helene J. Kantor: Further Evidence for Early Mesopotamian Relations with Egypt, *JNES* 11, 1952, pp. 239-250; M. Dothan: High, Loop-Handled Cups and the Early Relations between Mesopotamia, Palestine and Egypt, *PEQ*, 1953, pp. 132 ff.; Schott, *op. cit.* (supra, n. 6), p. 36; and Albright's remarks, *op. cit.* (supra, n. 38), p. 114: 'Since there is no evidence of an invasion of Egypt at that time by Asiatics, as has been rashly assumed, it is possible that this influence was brought into the land by the Egyptians themselves, who may already have established some kind of ascendency over Palestine and the coastland of Syria just as they did in the First Dynasty.'

The Excavations at Tell Abu Matar, near Beersheba

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TELL Abu Matar is a small mound on the right bank of the Beersheba Valley, 1.5 km. SE of the old city of Beersheba (Map of Israel, 1:100,000, Sheet 15, ref. 12860715; cf. Fig. 1). Downstream from the town the wadi which scoops out a deep wide bed in its old alluvia forms a loop towards the NW and cuts a high white chalk cliff in its former bank. Towards the apex of the curve, where the waters of the small basin of esh-Shurafa converge, the cliff slopes down and is transformed into a 200 m. long range of gently undulating hills, covered by loess and sandy loam (Pl. 2A, B). It is on these hills, 12 m. above the flood-plain of the valley at an altitude of 258 m., that Mr. David Alon discovered in 1952 traces of Chalcolithic occupation.

Preliminary investigation revealed a concentration of sherds and flints towards the top of the slopes dominating the valley, but particularly on the small mound which we decided to excavate. It is difficult to delimit the total area in which traces occurred on the surface, as the hills were disturbed ten years ago by the construction of terraces for a banana-plantation (faintly visible in Pl. 2A). The large quantity of water needed for this plantation comes from a well (Bir Abu Matar: 'Well of the Father of Rain') 19 m. deep. The mound was spared, possibly because it was thought too difficult to terrace it, or because the remains of an Arab cemetery were by that time discovered under its ploughed surface (Pl. 2A).

Our first campaign of excavation was undertaken with the aid of the French National Scientific Research Centre and with the authorization of the Department of Antiquities, and lasted from 20 September until 25 October 1952. It was followed by a second season with the assistance of the Department of Antiquities from 11 October 1953 to 11 January 1954, and by a third season, 20 March to 10 May 1954, with a grant from the Museum Haaretz, Tel Aviv, and the assistance of the Ministry of Labour and of the Beersheba Municipality.

Fig. 1. Location map.

The surface of the zone excavated amounts to over 1500 sq. m., including Areas III & IV (Fig. 2). Almost the entire settlement now seems to have been laid bare, and although isolated houses have been located further SW (Area IV), it is already possible to conjecture about the general disposition of the settlement.

STRATIGRAPHY

The mound excavated consists of a layer of yellow loess (Beersheba loess) on an average 2.5 m. in depth, covering a sandy, reddish-brown, compact, alluvial loam 2 to 3 m. in depth, which rests on sandy, whitish chalk of the Miocene period.

In the loess and loam underground dwellings were excavated at different intervals and at various depths, sometimes going down to the bedrock. They were connected and grouped together by galleries and approached through shafts and tunnels; huts, silos and hearths of the same period were found on the surface.

During the period of settlement the ceilings of these artificial caves were apt to crumble, which resulted in pits in the ground which in turn would fill up. Finally, rectangular houses with stone foundations were built on the tell itself on top of previous structures. This brief description gives some idea of the complexity of the stratification. With structures on the surface corresponding to others several metres down below, relative heights lose their meaning and we can only speak of levels in a broad sense. Furthermore, the definition of these levels is very ticklish especially when we come to relate the different groups to

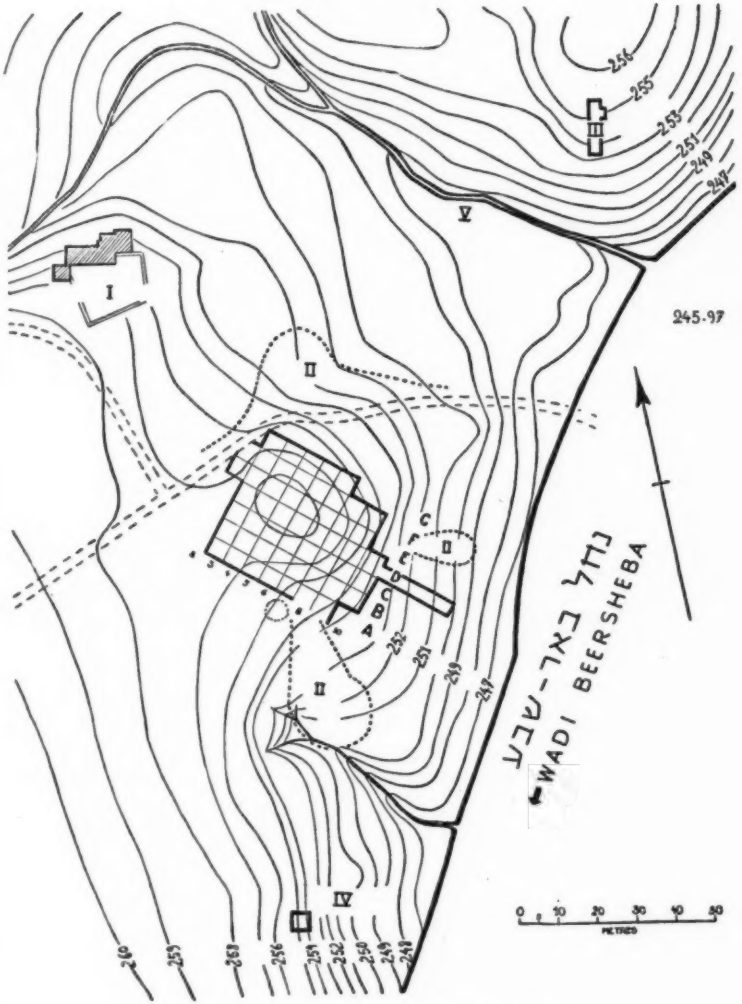

Fig. 2. Topography of Abu Matar and vicinity.
I—Arab house at Bir Abu Matar; II—dumps; III—sounding T;
IV—sounding M; V—rock with cup-marks.

each other stratigraphically or to determine the stratigraphic position of isolated structures. This is, however, indispensable if we are to attempt to unravel the successive phases of this relatively short period and to recognize the evolution of an homogeneous culture.

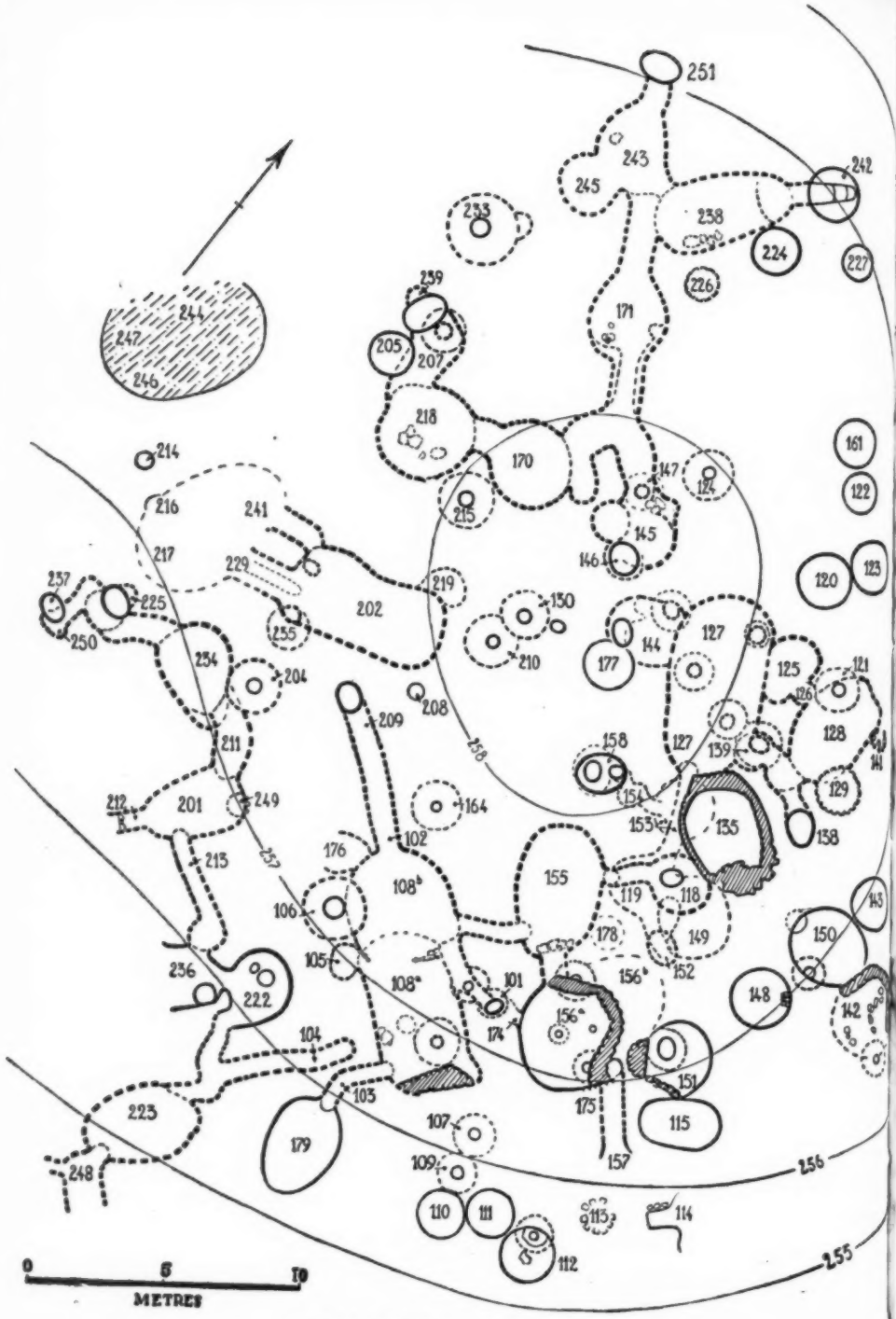

Fig. 3. General plan of underground dwellings.

The best plan seems to be to study the stratigraphy of one group of houses; this will form the basis for a general stratigraphy of the tell and a framework within which, by comparative methods, the location of the other groups of dwellings and of isolated houses may be fixed. Consequently, the stratigraphy of the most important group (group I) is here given in detail.

STRATIGRAPHY OF GROUP I[1]

Situated at the east side of the tell, towards the wadi, group I consists (Fig. 3)—in the order in which they are to be examined here—of subterranean houses and artificial excavations numbered as follows: 127, 125-126, 128, 138, 139, 153, 154-158, 119-149-152, 118, 116, 135, 136-137, 155, 156, 108 and 106.

127 (Fig. 4) An oblong artifical cave (6.5 m. × 3.5 m.) slightly narrower towards the centre (3 m.) is oriented roughly N-S. It communicated through tunnel 153 with 119 and 149 and by passage 139 with 128. The bottom of 127—or first floor of occupation—is at mark 97.10, 2.5 m. below the old surface of the hill, here determined by the mouths of silos 121 (98.50) and 158 (99.70). The floor of the dwelling is marked by numerous pits and silos dating from the various periods of occupation represented by the different strata of layer 9 (Pl. 3 B); it is preferable to study them in conjunction with this layer.

There are nine principal layers, from bottom to top (Fig. 5):

Layer 9

Extending along the whole surface of 127 but varying in total depth (average 0.15 m.). Towards the centre (near VI, IX, XI on Fig. 5) as many as seven distinct strata are discernible, i.e. from bottom to top:

(g) grey, ashy, covering the patches of coloured pebbles directly (XI);
(f) black, ashy, with traces of charred wooden stakes in section, a few centimetres in diameter, penetrating into the preceding layer;
(e) yellow, sandy;
(d) black, ashy;
(c) brown, with white grits; sections of stakes;
(b) brownish-yellow, with impressions of ears of barley (mineralized grains);
(a) grey, ashy; many sherds on the surface.

[1] The datum line mark 100 from which all spot heights are measured is at 258 m. above sea-level. The highest point of the mound is in square D5, at mark 100.31, i.e. at 258.31 m.

Fig. 4. Plan of dwellings 127, 135 and vicinity.

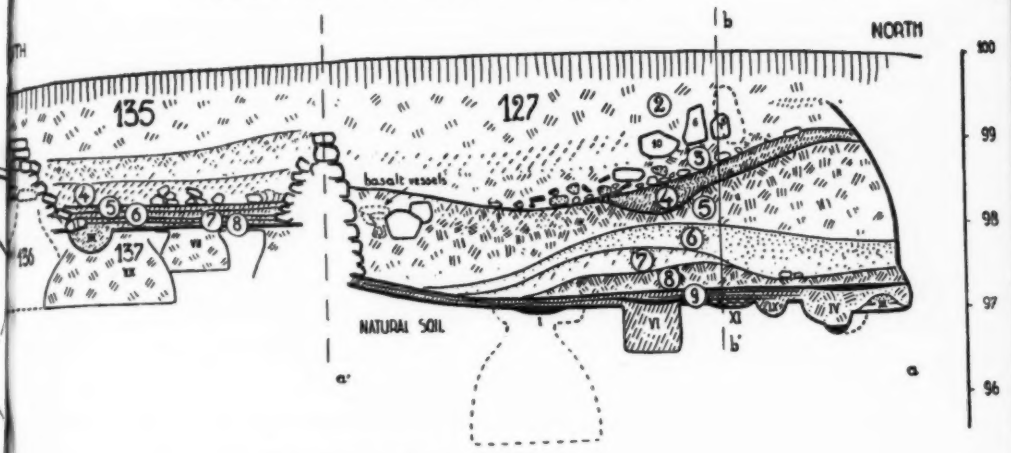

Fig. 5. Longitudinal section 127-135.

In the remainder of the dwelling layer 9 shows only one or two strata of ashes covering pits and silos or reaching to their edges (which enables us to determine when the silos were in use).

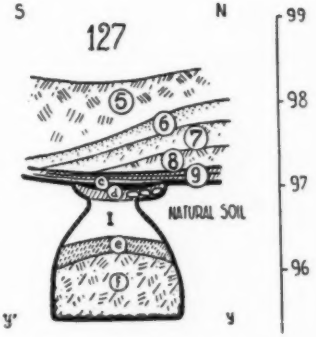

Fig. 5a. Section at silo I.

[I] (Fig. 4) Silo (depth 1.6 m.; diam. of base: 1.5 m. to 1.7 m.; diam. of opening: 0.6 m.). Filling, from bottom to top (Fig. 5a): (f) sandy earth, greyish yellow; 0.7 m.; (e) compact grey ash forming a sort of crust; 0.2 m. In the upper part of the silo, widened and converted into a hearth: (d) light ash, greyish-green; charred stone and pebbles; (c) black ash; (b) yellow sand; (a) ashy earth, grey with a thin stratum of black.

[II] Four adjacent pits: One and Two—contiguous, cylindrical, flat-bottomed (diam. 0.5 m. and 0.44 m., depth 0.35 m.). Filling of brown sandy earth covered by two black strata. Pits Three and Four are conical (diam. 0.5 m., depth 0.4 and 0.5 m.); pit Four has a secondary depression of 0.25 m.; the edge of Three mets the black top stratum of layer 9 (Fig. 7).

[III-IV] Oval pits (1.3 m. × 0.8 m.), adjacent, shallow (IV = 0.4 m.); III has been partly dug into the wall of the dwelling (simultaneously with a small niche further to the right which contains the skeleton of a new-born child). In the middle of pit III is a heap of white sand. A thin

layer of black ash at the bottom of IV is covered by yellow sandy earth (0.5 m.), and on top of that is another thin layer of black ash.

[V] Silo (depth 1.2 m.; diam. of base 1.3 - 1.35 m.; diam. of opening 0.65 m.). Filling, from bottom to top: (b) ashy earth; no finds; 0.2 m.; (a) brownish-grey sandy earth with large stones, pebbles and potsherds at a depth of 0.6 m. The relation of the mouth to the strata of layer 9, here reduced in thickness, could not be established.

[VI] Cylindrical pit (diam. 0.7 m., depth 0.6 m.) filled with light grey ash, covered by the strata g-a which sag slightly over this pit.

[VII] Oval pit (0.85 m. × 0.55 m., depth 0.55 m.) communicating below with silo I through a hole for the disposal of ashes; filled with grey ash with, towards the top, darker strata which connect up with the strata of silo I.

[VIII] Kidney-shaped, shallow pit (0.2 m.) joined to the opening of silo X; filling of black soil.

[IX] Shallow (0.25 m.) oval pit covered by strata g-a.

[X] Silo [depth 0.9 m., diam. of base 0.95 m., of opening 0.65 m. (Fig. 6a)]; brown sandy earth containing the grave of an adult under a pile of boulders.

[XI] Patches of coloured pebbles resting on the first floor and covered by strata g-a; one of these patches has been disturbed by a wooden stake driven through the later floors (Fig. 6).

I, VI and XI certainly date from the beginning of the occupation; VII and II (Pits Three and Four) date from the end of occupation at this level.

Layer 8 (Figs. 5-6)

In the central and northern parts; loess in small clods; no finds; 0.3 m. May result from a partial crumbling of the upper parts or from the lateral excavation of 125-126 and 144.

Layer 7

In the central part only; greyish-yellow sandy earth, apparently of aeolian origin (which would confirm the preceding assumption of an opening in the ceiling); no finds; 0.3 m. Some stones and potsherds on the surface.

Layer 6

In the northern part, thus placed on a level with the floor of 125; rapidly loses depth from the centre to the south. Reddish sand. No finds except for

large pithos with lug handles in a hole (XIII) which has been dug down to the first floor through layer 8 and whose orifice reaches up to the surface of layer 6 (Fig. 6a). Average thickness 0.5 m. Some debris on the surface.

Layer 5

Yellow loess in large clods except at the higher level which is greyish. Average thickness 1 m. Some large stones in the southern part, above 97.50. This layer may represent the complete collapse of the roof followed by wind-blown sand. Traces of occupation occur in this layer.

Layer 4

Quickly dwindles towards the south and east. Black ash with sandy median stratum. Some sherds, bones, cereals, copper, etc. Average depth 0.25 m.

Layer 3

Yellow earth with concretions towards the bottom, full of debris (bricks, sherds, jar-stoppers, pieces of roofing, etc.). The top of this layer is at 99.00.

Layer 2

At this level, boulders were arranged standing in a semi-circle; one of them bears on its back a number of shallow cup-marks. A small tripod vase of basalt was found nearby (Figs. 5-6).

125-126 NE of 127 and connected with it and with 128 (Figs. 4, 6, Pl. 4A). In 125 we find the bottom (97.60) of an almost circular cave (diam. 2 m.) in whose centre is a pit of the same depth, 0.3 m. in diameter, with a small channel running into it. In 126, there is a niche with a hollow base separated by a thin ledge from 125; it overlooks 128 through a small round window (diam. 0.3 m.) (Pl. 5 B). At the bottom of the basin in 126 (97.45) was found the crushed skeleton of a newborn child, oriented in S-N direction, facing east; above are traces of a fire with large lumps of charcoal and very few ashes; after the extinction of the fire, the window opening into 128 was blocked by three bricks jointed with earth.

The filling consists of three layers: layer 6 of 127 partly covers the floor of 125; layer 5 appears here as sterile yellowish sandy silt (0.3 m.); it seems to be the product of rainwater washing layer 5 of 127, which at that time was exposed. At the level of the ledge of niche 126 a thin stratum of reddish loam with

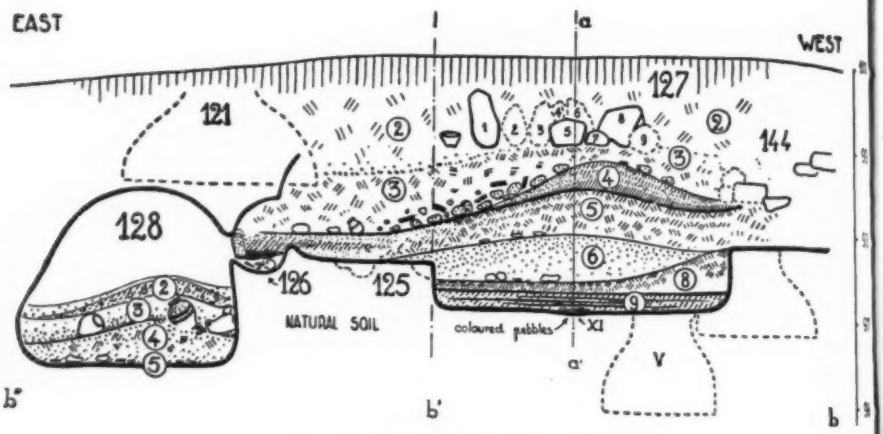

Fig. 6. Transversal section 127, 125-126-128.

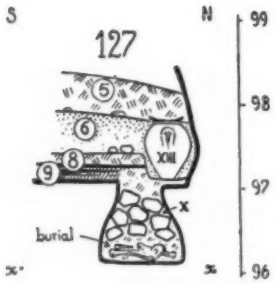

Fig. 6a. Section at silo X.

fragments of charcoal derives from the ashes of the fire of 126. Above it, a thick layer of debris is merely the continuation of layer 3 of 127.

The inhumation in 126 and the blocking of the round window are, therefore, contemporary with the deposit of layer 6 of 127 or immediately after it; at all events, these operations preceded the formation of layer 5.

128 This artifical cave, amazingly well preserved, measures 4.4 m. × 2.5 m.; its entrance (138) is from the south and it links up with 127 by passage 139 (Figs. 4, 6-7 and Pl. 4 B,C).

On the first floor (5) at point 97.30-97.40, a few stones, sherds, fragments of copper tools and isolated fragments of charcoal were covered by a layer (4) of sandy loam (0.5 m.), on whose surface were found ten jars of different shapes. Above it, layer 3 consists of earth with concretions formed by the gradual crumbling of the originally lower ceiling. The roof finally succumbed under the weight of the debris which had accumulated in silo 121 immediately above, part of the debris falling into the cave (2). Even so, cave 128 remained empty for more than half its height, its walls covered with crystals of gypsum (Pl. 4B).

If this cave was inhabited at all, it was only for a very short period; there is no trace of a fireplace or of the usual installations. Its cutting may have been contemporary with that of 127; it cannot be later than the deposit of layer 6 there.

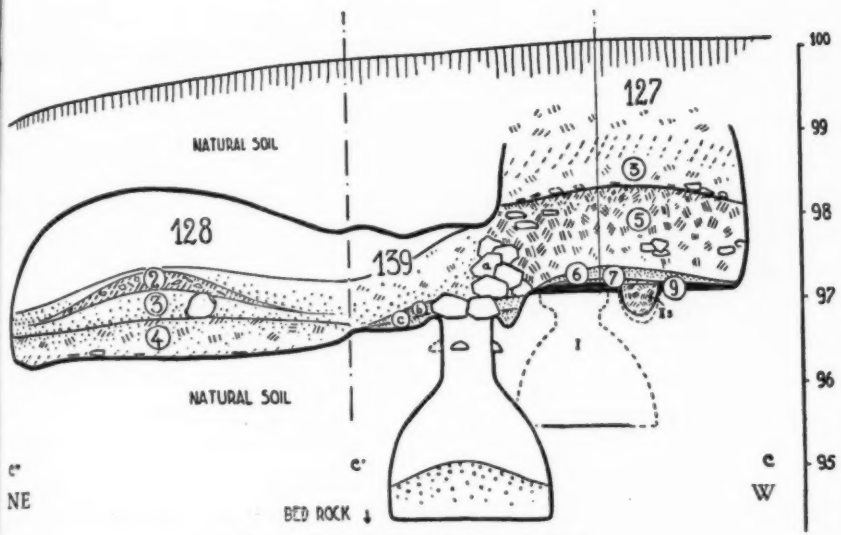

Fig. 7. Transversal section 127, 139, 128.

138 The entrance of this tunnel cannot be located precisely; a shallow entrance-shaft is a likely hypothesis. At its outlet into the passage 139, this tunnel was blocked by a wall of large slabs of flint; only the foundation, of small stones, remains *in situ,* the slabs which blocked it having been flung outwards or inwards (Fig. 4).

139 Linking up 127 and 128, this passage broadens out to 1.5 m. giving place to the aperture of a very deep silo (2.4 m.) which, at mark 94.40, reaches down to the bed-rock of the hill (Fig. 7).

The oval aperture of this silo (0.7 m. × 0.5 m.), slightly narrows into a long neck (0.7 m.) with four deep footholds, 0.4 m. below the edge, facing each other in pairs to facilitate descent and ascent. Although this silo is of normal diameter (1.8 m.), it has a capacity of over 3000 litres (the average being from 1500 to 2000 litres).

It is clear (Fig. 7) that this silo was constructed later than silo I of 127, which was possibly already out of use, but whose existence was known.

The filling of passage 139, from bottom to top, is as follows (Fig. 7): (c) Yellow sandy earth with some flints, stones and sherds; 0.15 m. (b) Red sand analogous to that of layer 5 of 127 (0.1 m.). This same material is used for jointing two large stone blocks obstructing the silo, which was found to be al-

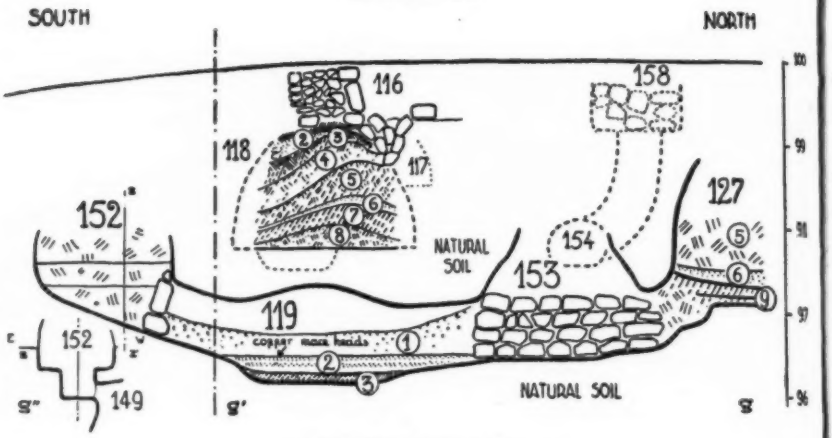

Fig. 8. Section of tunnel 153, 119.

most empty, containing only a layer of earth with concretions resulting from the crumbling of the walls. Some sheep's bones and splinters of flint were found at the bottom. (a) A heap of boulders and bricks blocks passage 139 at the level of the silo's orifice and contains, on the side joining 127, the hardened yellow clods of layer 5.

This passage was therefore walled in before the formation of layer 5 and after the deposit of layer 6. It may be supposed that the entrance of 138 was blocked when the round window was cut in 126. It appears that between the time when layer 6 of 127 was deposited and the time when layer 5 was formed, cave 128 was blocked up after some ten jars and various pots had been placed in it; the burial under the place of the fire in 126 occurred at the same time, followed by the blocking of the round window which opens out on cave 128.

Later, we shall find that this cave was soon opened up again and the wall sealing the entrance 138 was demolished. It may even be possible to determine the date—and the perpetrators—of this 'violation'; a painted sherd found in cave 128 matches another belonging to layer 3 of 127.

153 A narrow tunnel, 3.75 m. long, 0.6 m. wide, joins 127 (97.10) to the artificial caves 119 and 149 (96.30 and 96.00) (Figs. 4, 8). The part of the tunnel which crosses (in 153 b) a large disused silo (?) (diam. 2.5 m.), is formed by two parallel stone walls of five courses each, 0.8 m. high, holding back the soft soil of the earlier filling of the silo (Pl. 5A).

In this region the tunnel is obstructed from 96.45 (base) to 97.05 by brown earth with some debris in it; from 97.05 to 97.55 by a layer of silted sand which supports the NW walls of house 135.

The period during which the tunnel was in use is, therefore, well-defined. Contemporary with the first occupation of 127, it ceases to be used before the construction of 135. Moreover, its outlet into 127, which is very low down (97.30) must soon have been concealed by the rise in the ground of 127.

Silo 153b must be anterior to excavation 127.

A narrow tunnel (154) rather twisted in shape (Fig. 4) emerges from above (at 97.55) into this tunnel—or into silo 153 b. It opens out (at 99.10) into the bottom of an oval pit (158).

Tunnel 154 was full of grey ashy earth with very few finds. The same filling was found in the curious silo (bulging twice and possibly unfinished) which also opens into 158 (its depth is 2.2 m.); once the silo was full, its orifice was separated from the entrance of tunnel 154 by a thin wall whose upper course is at the old surface level at 99.70.

119 and 149 119 is a small low cave (1.1 m. in height), oval in shape (1.8 m. × 2.2 m.) entered from the south by a tunnel which opens into 152. This cave communicates on one side with cave 149 (3 m. × 2 m.) which is at a slightly lower level and on the other side with 155 by a narrow vertical shaft in the floor of the passage joining this dwelling to silo 118 (Figs. 4, 8 and 11).

The floor of 119 (96.30) was covered by a thin layer (3) of grey ashy earth containing fragments of charcoal, pottery, etc. (0.1 m.), covered by a sterile layer (2) of silted sand (0.2 m.), which had been deposited by water filtering in from 153. This layer (2) extends equally at 96.60 in tunnel 153, in 119 and in 149. On the surface of this layer in 119 were found three copper mace-heads, an ornamented hilt of the same metal, a small bowl and some debris; all these were covered by some decimetres of earth with concretions (1) originating from the disintegration of the walls. The upper part of the cave remained empty.

There were analogous deposits in 149 (1.5 m. from bottom to ceiling), with, at its base (96.00), a thin blackish layer containing pottery and flints (in particular many sickle-blades).

Tunnel 152, which has its starting-point (97.50) at the bottom of an oblong ditch, slopes gently down between two banks (Fig. 8). A kind of air-shaft opens out at the base of the right bank into 149, in that part of the dwelling where the

small pit, possibly the site for a fireplace, is situated. The entrance (152) was carefully blocked with slabs of flint (Pl. 6B); access from 155 was obstructed by a fall of boulders (Fig. 11).

118 A large silo (diam. 2.1 m.), above (97.80) caves 119 and 149 and contemporary with house 135 (with which it has a common wall), 118 b was made inside a previous excavation (118 a) which was joined to 155 by a horizontal tunnel blocked when 118 b was made. Possibly, therefore, house 155 was no longer in use when house 135 was built (Fig. 4).

Silo 118 (depth 1.4 m.) opens (at 99.10) by means of an oval aperture (0.8 m. × 0.6 m.), very much out of centre. Its filling consists, from bottom to top, of 8 layers (Fig. 8):

8. brown sandy earth with white grits;
7. grey ashes;
6. yellow sand;
5. grey ashes (cereals);
4. grey sandy earth;
3. black earth (cereals);
2. yellow sand;
1. greyish-brown earth under pebbles bordering the aperture to the east.

116 Above silo 118 and later than its filling is situated a semi-circular stone structure whose uppermost course reached the 99.90 mark, 10 cm. below the present surface of the tell (Fig. 8). This structure partly crumbled down into silo 118 and into a small neighbouring silo (?) 117, also later than the filling of 118 and containing a grave.

135 This house is built of stone and brick on an irregular oval plan (Pl.6A). Its interior measurements are 3.5 × 2.5 m. (Figs. 4, 5).

It is built on previous pits; its first floor of stamped earth (at 98.00) overlies an uneven floor with pits (VII) and silos (137), whose sterile earth filling appears to be contemporary with the construction of the house.

The NW wall, preserved to a height of 1.75 m., is propped up on the outside (at mark 97.40) on layer 9 of 127 and on the inside (at mark 97.55) on the layer of silted sand of 153. On the south, the wall, which has crumbled down,

covers silo 136 (depth 1.2 m., diam. 1.5 m.) which still has its cover of stone slabs and is full of ashes and fragments of burnt brick. This silo, whose base intersects that of silo 137 (diam. 1.7 m.), was separated from it by a small wall of stones jointed with clay.

The eastern wall partly conceals a small circular pit.

These structures, earlier than house 135, no doubt belong to the same dwelling as 118 a.

In the floor of house 135 were dug one small shallow circular pit (III) and two oval pits (0.8 m. × 0.6 m.), the first of which (II) served as a fireplace. It had a hole at the bottom through which the ashes fell into the disused silo 137. On the floor of 135 were deposited (V) coloured pebbles in octagonal or cruciform formation. These pebbles are covered by a very thin layer of black ashes; on it are based the stones of a small structure built before the construction of the west wall of house 135.

The filling of 135 comprises four principal occupation layers 0.25 m. thick, from bottom to top (Fig. 5):

8. ashy earth, with a darker stratum (0.1 m.). This layer passes under a powerful buttress built at the inside against the NW wall. It may be that this precaution was taken after the collapse of the upper parts of dwelling 127 (layer 5).
7. ashy earth, lighter in colour (0.05 m.), separated from layer 6 by a floor of stamped earth, brown with white grits. A few sherds.
6. grey earth with fragments of charcoal and a few sherds; top floor of stamped earth; 0.05 m.
5. grey soil with black ashy stratum; many sherds; 0.05 m. On this layer in the middle of the dwelling stones were lying in disorder (Pl. 6A); at the NW, surrounding the base of the older buttress, a row of stones may have marked a fireplace.

Layer 5 is covered in its turn by a thick deposit (0.8 m.)of ashy soil followed by layers of disturbed earth.

155 Oblong and oriented NW-SE, dwelling 155 measures 4.5 m. × 3.1 m. (Fig. 9). It communicates at the SE by a wide passage (0.8 m.) with dwelling 156; at the east side with 118 and 119-149; at the SW with dwelling 108 (Pl. 7A).

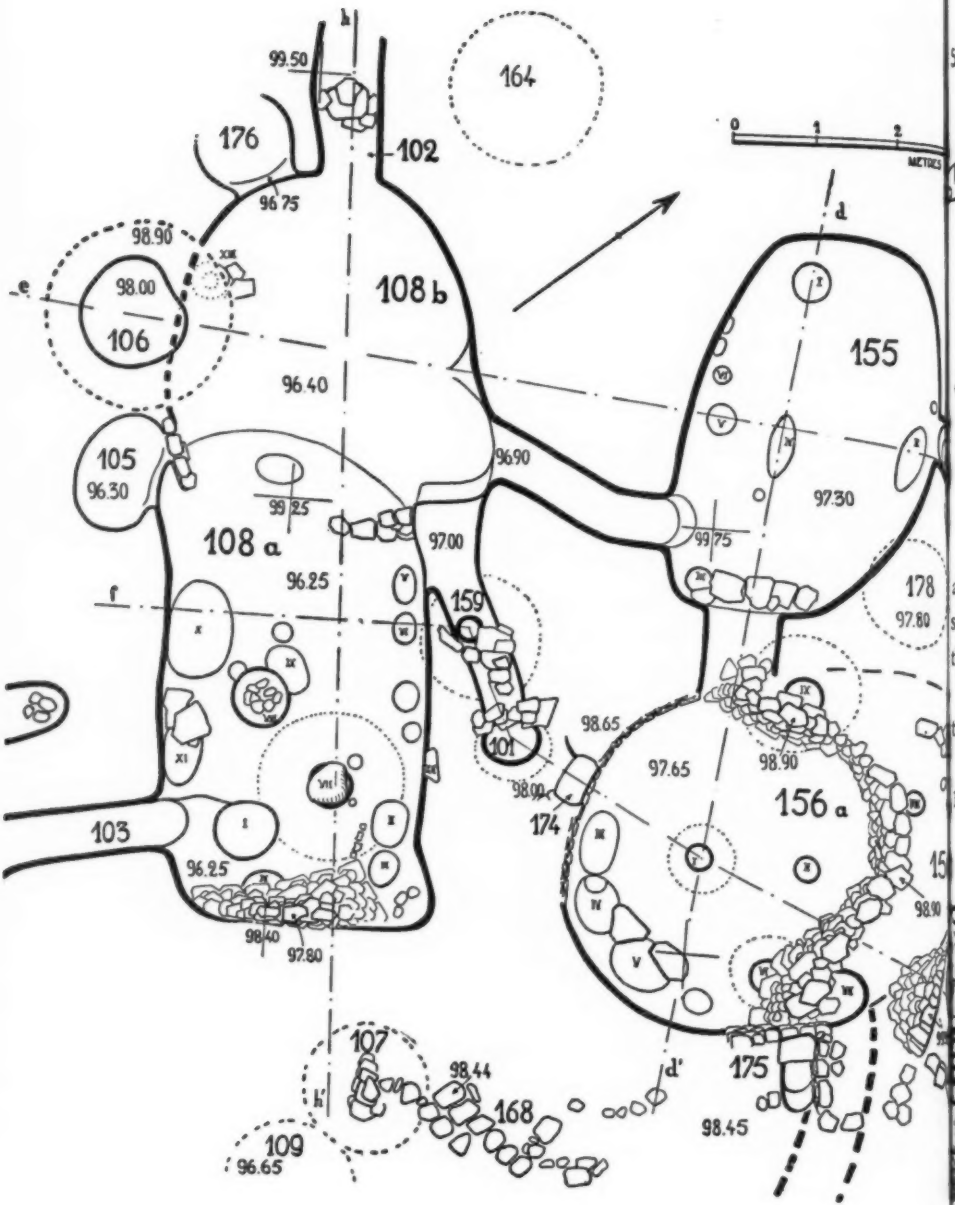

Fig. 9. Plan of 155, 156, 108.

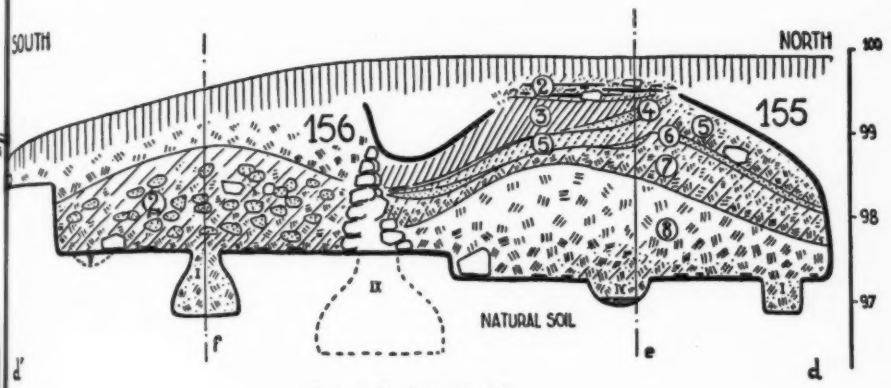

Fig. 10. Section 155-156.

Into the floor (97.30) at 2.2 m. below the old surface are dug two elongated and shallow (0.4 m.) oval pits (0.8 m. × 0.35 m.—II and IV on plan) and several small circular pits. A row of large stone blocks near entrance 156 may be the base of a wall blocking the entrance.

The occupation appears to have been short-lived: a thin blackish layer covers the floor; pit IV is half-full of grey ashes.

The filling consists, from bottom to top, of seven principal layers (Figs. 10, 11):

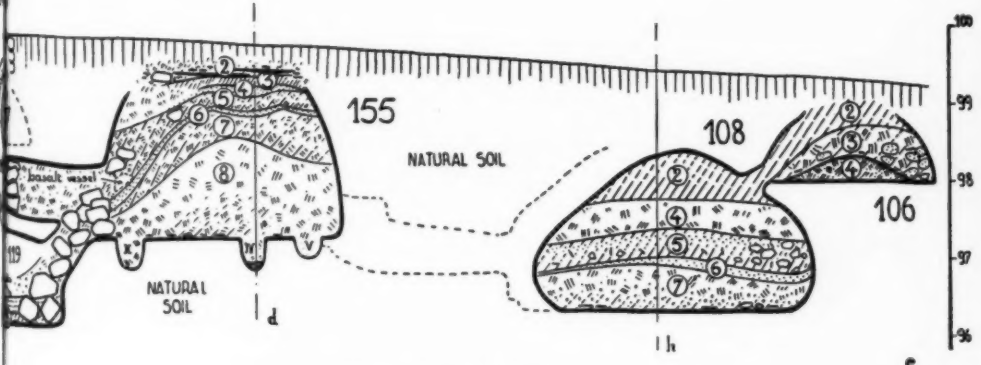

Fig. 11. Section 155-108.

8. sandy loess, no finds; from 0.7 m. to 1.4 m. This layer represents the partial collapse of the roof, leaving a central gap through which the cave continued to be filled later on.
7. grey very ashy earth; an occasional sherd; 0.5 m. Thick layer, like layer 8, thins down considerably towards passage 119.
6. yellow sand washed down on the east side to the bottom of the slope; boulders and a basalt vase near passage 119; a few bones and sherds.
5. thinner towards the east; grey ashy earth (0.4 m.).
4. yellow sand forming a thin crust at the east. This part of the deposit is washed away by the rainwater which hollows out the top of layer 5.
3. black soil, with charcoal; no finds; 0.3 m.
2. grey sandy earth; traces of fireplace; stones, many sherds.

E of the dwelling a small silo (178) was dug, partly in the filling (layer 8) of 155 (depth 1 m., diam. 1.3 m.).

Filling from bottom to top:

(e) sandy loess; no finds; 0.1 m.
(d) greyish stripped loam; no finds; 0.2 m.
(c) grey, powdery ashes; no finds; 0.1 m.
(b) loess in small clods; a few sherds; copper, charcoal, 0.5 m.
(a) grey ashes.

156 This dwelling (Fig. 9 and Pl.7B) which was only partly buried (97.65) underwent the following modifications:

1st stage: It comprises 156 a and 156 b with silos VI and IX and pits VIII and X; it may be connected with tunnel 152. Access is from VII by a fairly wide tunnel (0.8 m.) with a low ceiling (0.7 m.) which opens out lower down the slope (157).

2nd stage: The entrance tunnel is replaced by a covered way (175) built of stone and brick, 1.25 m. long and 0.6 m. wide (Fig. 9). This passage which opens out into the interior of the house at 0.4 m. above the floor, emerges on the outside onto a burnt floor (the old surface) at mark 98.45. No doubt at the same time, the western wall was reinforced with a facing of flat stones covered in mortar at a height of approximately 0.7 m. in which, at 0.4 m. above the floor, a kind of window (174) measuring 0.4 m. × 0.4 m. is cut. This window opens (in 101) into a tunnel leading to dwelling 108 (Fig. 12). The passage to 155 was then still in use.

Filling (only in 156 b): a total depth of 0.3 m., from the bottom up (Fig. 12):

5. grey layer with a few sherds.
4. layer of yellow earth with two strata of loam; no finds.

This filling seals off the pits and silos:

[VI] Silo (depth 0.8 m., base diam. 1.15 m., diam. of aperture 0.55 m.), filled with ashy earth containing a few sherds.

[VIII] Pit (diam. 0.3 m., depth 0.3 m.); grey earth.

[IX] Silo (depth 1.2 m., diam. of base 1.4 m., diam. of aperture 0.45 m.); stone cover preserved; contains only a layer of sandy earth (0.3 m.) and a few objects.

[X] Shallow oval pit, bordered with stones, filling: grey ashes, a few sherds.

3rd stage: Construction of a semi-circular wall limiting 156a (Pl. 7 B) at the NE; its base is erected at the back on layer 4 and at the front (on the inside) on the old floor cleared of its deposits. The dumps of earth from this clearance were thrown behind the semi-circular wall (layer 3, Fig. 12), no doubt during its construction. This wall (97.65-98.70) obliterates passages 155 and 175.

The floor of 156 a contains pits and silos:

[I] Silo (depth 0.8 m., diam. of base 0.8 m., diam. of aperture 0.35 m.); filled with sandy yellow earth; no finds.

[II] Cylindrical pit (diam. 0.4 m., depth 0.5 m.) filled with yellow earth; contained a small red-edged bowl.

[III-IV] Shallow oval pits.

[V] Hearth in an oval depression, edged with two large stones and filled with black ashes.

Only hearth V is indubitably contemporary with the third stage.

Filling: A heavy layer of ashy earth (layer 2) with a large number of mud-bricks (the upper parts of the houses—Figs. 10 and 12) fills dwelling 156 a with a deposit averaging over 1 m. in depth.

108 Oriented N to NW, S to SE, this dwelling measures 8.8 m. × 3 m.; it was dug in two phases (Pl.8A,B).

The first excavation (108 a) is nearly rectangular in design (5.65 m. × 3 m.); access to it is through a horizontal turning tunnel (103). It is 2.7 m. long, 0.5 m. wide and 0.8 m. high, and opens into a large oval depression (179) (at 96.50), 1 m. below the present surface (Fig. 9).

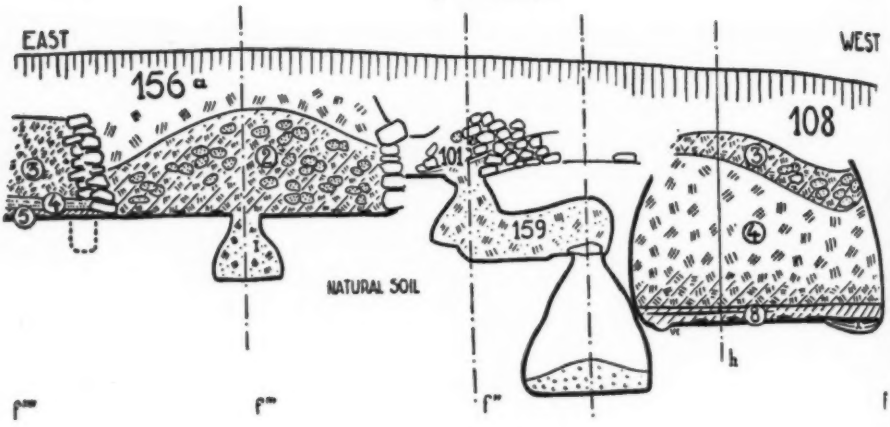

Fig. 12. Section 156-108.

The floor of 108 a contains many pits and one silo:

[I] Cylindrical pit (diam. 0.65 m., depth 0.4 m.); filling: (b) greyish-yellow earth (0.35 m.); (a) dark brown sandy earth.

[II-III-IV-V-VI-IX] Shallow oval pits.

[VII] Silo[2] (depth 1.5 m., base diam. 1.7 m., diam. of orifice 0.5 m.). It still has its stone lid and contains only a little earth with concretions; no finds.

[VIII] Pit in shape of truncated cone (diam. of orifice 0.7 m., depth 0.5 m.); containing: (b) greyish-brown sand and many pebbles (0.4 m.); (a) black ash (fireplace whose centre is the small pit VIII b).

[X] Large oval pit (1 m. × 0.75 m. × 0.17 m.); filling: (c) compact brown earth, a few sherds; (b) thin layer of reddish earth with white grits; (a) black ash (= layer a of VIII).

[XI] Shallow oval pit, limited on the N side by three large stones.

A small low elongated niche (XII) in the NE wall, 1 m. above the floor, contained a bone awl.

Layer 8, 0.3 m. thick in the SE portion (Fig. 13), corresponds to the first occupation. This layer contains one or two darker strata but they do not extend across the whole dwelling. — It is after the deposit of this layer that the massive south wall (96.55-97.80) was built.

After this the dwelling is enlarged towards the NE (108 b); a wide entrance tunnel (length 7 m. × 0.8 m.) rises gently towards the centre of the hill (Pl. 8B)

[2] Marked I on Fig. 13.

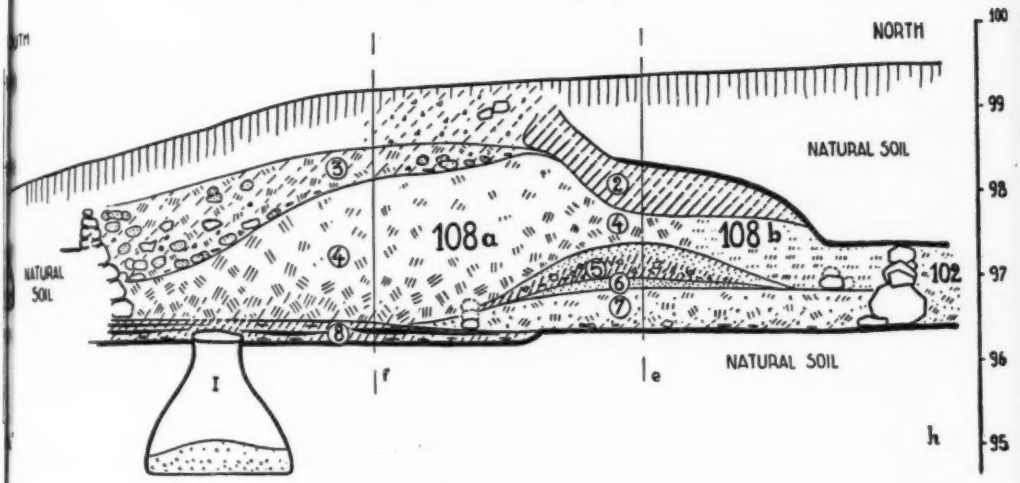

Fig. 13. Longitudinal section of 108.

where its aperture is obliterated by a layer of debris in which the foundations of wall 169 are buried. A second tunnel joins 108 b to 155; it appears that this tunnel was not finished (possibly owing to the hardness of the loam in this part of the hill). This would also explain why not one pit was dug in the floor of 108 b, which bears only a large neckless jar (XIII) wedged in with stones. A small adjacent room (176) opens out rather high up in the wall (96.75), at the base of the loess. Previously, 105 must have been a similar annexe for 108 a. Two small walls of stone and brick, limiting 108 b towards the south, are based on layer 8 of 108 a.

Filling: few traces of occupation were found on the floor of 108 b (96.40). Tunnel 102 is blocked by a wall consisting of an enormous block of stone and smaller stones; on the outside it is filled to its full depth with sandy earth; no finds.

The filling of 108 includes from the bottom up (Fig. 13): in 108 b:

7. brown earth with concretions; some debris; 0.5 m.
6. yellow sand; no finds; 0.1 m.
5. grey ashes with stones and sherds, and an intermediate stratum of yellow sandy earth; no finds.

In 108 a and 108 b:

4. yellow loess earth with large clods, no finds. This layer may correspond to the collapsed roof of 108 a, washed down into 108 b by rainwater.

In 108 a: 3. grey ashy earth with many bricks and stones.

In 108 b: 2. fine grey ash, originating from 106 and corresponding to its layer 2.

Above, disturbed earth, ashy with stones in the centre.

Dwelling 108 b is joined to 156 by a tunnel (159) which has as its starting-point, near window 174-156, an older silo (101) (depth 0.8 m., diam. 0.8 m.). In this tunnel, which opens out into 108 at 0.75 m. above the floor (Fig. 12), there is a huge silo (177) with a very small aperture (0.3 m.) which still has its cover, and is empty except for a little loess with concretions. This silo, whose excavation has encroached slightly on dwelling 108 a, cannot have been dug until after the deposit of layer 8. Silo 101 was full of sandy loess (the tunnel likewise) and its orifice was blocked by a stone-wall built later.

It may be that the construction of this tunnel corresponds on the one hand to the digging of 108 b and on the other to the second stage of 156.

106 Large silo (diam. of base 2 m.); the bottom is at mark 98.00; the upper parts have been destroyed down to 98.90 leaving an irregular opening about 1.2 m. in diam. (Fig. 9).

Filling from the bottom up (Fig. 11):

4. sandy loess, no finds; next, a thin darker deposit.
3. grey sandy earth with numerous mud bricks and debris.
2. grey ashes.

The upper parts of the silo were used as a fireplace and an opening was constructed so that the ashes would fall below into the upper part of 108 b which was still empty.

Taken together, these stratigraphic data reveal three phases of occupation for group I, interspersed with phases of abandonment or destruction. We find successively from bottom to top:

Level I A

Successive digging of dwellings; the relative importance of the traces of occupation in 127 (layer 9) and in 108 a (layer 8) lead us to believe that these dwellings were built first; next, 128, 153, 154 and 158, 119 and 149 (layer c), 118 a, 136-137 and structures under 135, 155, 156 (1st and 2nd stages), 108 b, 102 and tunnel 101-159.

Level IB

Relatively short period of abandonment marked by deposits in which there were no finds: in 127 (layers 7-8), in 128 (4), in 119-149 (b) and the obliteration of passage 153, in 155 (layer 8: collapse of upper part of house), in 156 (4) and in 108 b (7); tunnel 102 was blocked by a wall previous to the abandonment.

Level II A

New occupation noted, for group I, by the building of house 135 with the contiguous silo (118 b) and by the renewed use of house 156 (3rd stage). It was at the beginning of this period that the ceramics were deposited in cave 128 and the cave closed (see above p. 26); the deposit of the copper weapons in 119 may be contemporary. The intermediate layers of 156 and 108 b are to be attributed to level II A; these houses were not reoccupied but some rubbish fell into them; the situation in 127 was similar until the collapse of the roof (layer 5); on this layer, occupation begins afresh.

Level II B

The upper parts of most of the dwellings show evidence of renewed abandonment, possibly even of destruction, with thick layers of ashes containing bricks and various debris in 127 (layers 4-3), in 156 (layer 2), in 108 (layer 3), in 106 (layer 3).

Level III A

Above these layers and corresponding to a third phase of occupation—best represented however in groups other than I—we find in 127 the stones of layer 2 standing in semi-circular formation, structure 116 and the fireplaces installed in the upper part of 106, layer 2 (and layer 2 of 108 b) and of 156 (layer 2) (?).

GENERAL STRATIGRAPHY

The stratigraphy of group I serves as a basis for the general stratigraphy of the tell. We shall not describe here the stratigraphy of the other complexes[3] nor the reasons which led us to attribute the groups of dwellings II and III[4] to level II rather than to level I. A few brief remarks will enable us to complete the definition of level III and state that of level IV.

[3] The above details have for the moment a purely illustrative value.

[4] Group II comprises dwellings 170, 218, 205, 239, etc., group III dwellings 201, 234, 236, etc.: see Fig. 3, supra, p. 20.

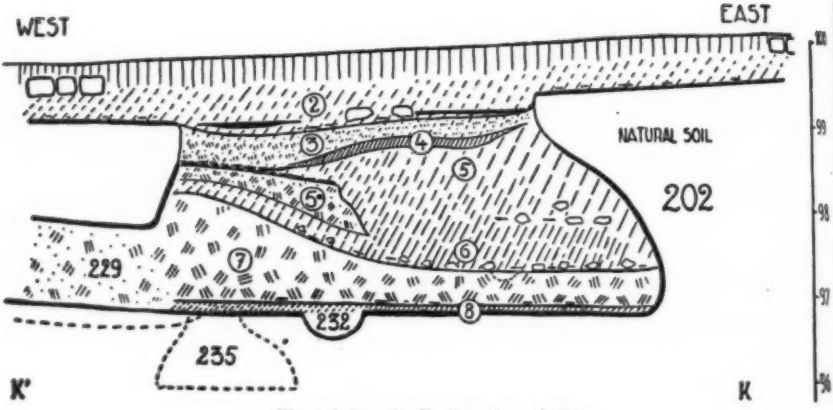

Fig. 14. Longitudinal section of 202.

The stratigraphy of house 202 (Fig. 14) serves as a link between levels I and II and the higher levels. It presents, from the bottom up (from 96.80 to 99.50) a layer of occupation (8) with at least two distinct floors attributable to level I A; above, a layer corresponding to the partial collapse of the roof (7) (level I B); superimposed on this layer is a thick deposit of ashy earth (layers 5-6) with small stones and miscellaneous debris (level II A) followed by a sterile layer of grey ashes (4), and a layer of ashy loam (3) with very few artifacts (level II B). Above, in the slight depression which remains of dwelling 202, there are several fireplaces between 99.00 and 99.20, and the edges of the depressions have been reddened by fire. These fireplaces are evidence of the occupation of level III A; they in turn are covered by a layer of debris, on an average 0.3 m. thick, extending widely over B4, C4, B5, C5, D5, C6, D6 (Fig. 2). Here the debris lies on a floor marked with various pits. It has not been possible, however, to delimit individual dwellings. This floor belongs to level III A (or earlier, since we are concerned with the exposed surface of the hill at this period) whereas in the layer of debris (III B) we find everywhere stone foundations of large rectangular houses the remains of which, in 163, 168, 169 and 173 represent level IV.

(To be continued)

The Fear of God*

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THE earliest term for religion in biblical Hebrew, and indeed in Semitic languages in general, is 'the fear of God'. This expression describes exactly the prevailing religious feeling in antiquity, or rather the one of the two basic elements in religion which was most in evidence before Amos and Hosea. Religion was never confined to fear, for the attitude towards the gods was never quite the same as that towards evil demons: in addition to fear there was always, no matter in what small measure, a feeling of longing for the presence of the deity, trust in a God's benevolence and helpfulness, and even love. These contradictory elements in religion, which explain its dynamic power and persistence, are clearly and nobly presented in Deut. x, 12, '...to *fear* the Lord thy God, to walk in all his ways, and to *love* him, and to serve the Lord thy God with all thy heart and with all thy soul'. One might compare this mixture of fear and longing in religion with the normal attitude of a small boy toward his father: respect, submissiveness, and fear on the one hand, but admiration, affection, and trust on the other.

The theory that fear gave rise to religion was first advanced by Democritus of Abdera (about 400 B.C.); it was adopted by Epicurus (died 270 B.C.), and brilliantly expounded by Lucretius (died 55 B.C.) in his *De rerum naturae* V, 1161-1240.[1] There may be an element of truth in this theory, which was summarized by Statius (about 50-100 of our era) in the famous line 'Primus in orbe deos fecit timor' (*Thebais* III, 661), 'fear first on earth created gods', especially if we interpret these words with Nilsson[2] as meaning 'not merely fear and timidity, but also respect, holy awe, confidence, and trust.'

The tendency in ancient Israel was to add to the notion that God is a king greatly to be feared, the notion that he was a father to be loved; but the sense of awe persisted in Israel (cf. Isa. vi, 5; Deut. x, 17; etc.). In fact, religion in

* This paper was published in Hebrew in *Eretz-Israel*, 3, 1953 (Cassuto Memorial Volume), pp. 59-62.

[1] See W. Jaeger: *The Theology of the Early Greek Philosophers*. Oxford, 1947, pp. 182-183, 250.

[2] M. P. Nilsson: *Geschichte der griechischen Religion*, I. Munich, 1941, p. 39.

general is the tension between opposite feelings of fear and longing; at its highest level (as in Deuteronomy), religion is love accompanied by a humble sense of inferiority, reverent trust in an immensely powerful and fearful deity, who is at the same time just and benevolent (cf. Exod. xxxiv, 6-7). Here, however, we are concerned with the earliest stages of religion, in which fear dominated and determined the forms of worship.

The expression 'fear of God' for religion is very significant: in early times it must have expressed the essence of religion, or at least its most important element. As might be expected, instead of the general term 'fear of God' (Gen. xx, 11; 2 Sam. xxiii, 3; Neh. v, 15), the Bible prefers the specific term 'fear of the Lord' (Isa. xi, 2-3; xxxiii, 6; Ps. xix, 9; xxxiv, 11; Prov. i, 29; ii, 5; viii, 13; x, 27; etc.; cf. 'to fear the Lord' in Deut. vi, 24; x, 12; xiv, 23; cf. 'your fear' in Job iv, 6; and similar expressions). Hammurabi in his Code (I, 31), calls himself 'fearer *(pa-li-iḫ)* of the gods.' In Ugaritic *plḫt* means 'fear' (see C. H. Gordon's *Ugaritic Glossary*, p. 262). 'Fear of God' occurs in Assyrian: in a letter to Essarhaddon (681-668 B.C.), Adad-shum-usur assures the king that, in addition to other signs of happiness and prosperity in Assyria, *sa-al-mu pa-laḫ ili ma-'a-da* (the fear of God—i.e., religion—thrives greatly);[3] cf. *taš-me-tum ša tap-laḫ-ši-ni* (the goddess Tashmetum whom you fear—i.e., reverence, worship).[4] This Akkadian verb *palâḫu* has an Aramaic cognate *(plḥ)* which developed some new meanings. In the text of the *Sayings of Ahiqar* found at Elephantine (lines 15, 17), dating from the 5th century before our era, the verb means 'to serve [a king]', but in *Corpus inscriptionum semiticarum* 141, 4, *palḥah* means 'worshipper', as also in Dan. iii, 12, 14, 17, 18; vi, 16, 20; in Ezra vii, 19, *palḥan* means 'worship'. In the Mishnah, Targums and Talmud, *plḥ* means 'to work; to serve; to worship'. We shall see that this semantic development is current in many languages.

Another Hebrew root, *pḥd* (terror), indicates the basic role of fear in the early religion of Israel. It is used for the terror inspired by the Lord (1 Sam. xi, 7; Isa. ii, 10, 19, 21; Job xiii, 11) and for 'religion' (Ps. xxxvi, 1, *paḥad 'elohim*). The God of Isaac at Mizpah or Beersheba was apparently called 'the fear *(paḥad)* of Isaac' (Gen. xxxi, 42, 53), although Cassuto[5] regards this view as an unlikely conjecture. According to Plutarch (*Cleomenes* 9), the Spartans 'pay honour to *Phóbos* [fear], not as they do to the powers which they try to avert

[3] See R. H. Pfeiffer: *State Letters of Assyria*, p. 118 (Harper, *Letters*, No. 2, line 13).
[4] Pfeiffer, *op. cit.* (supra, n. 3), p. 164 (Harper, *Letters*, No. 368, line 6).
[5] U. M. D. Cassuto: *La questione della Genesi*. Florence, 1934, p. 75, n. 3.

because they think them baleful, but because they believe that fear is the chief support of their civil policy' (translation by Bernardotte Perrin). *Phóbos* and *Deinós* (terror) were the sons of Ares and Aphrodite (Hesiod, *Theogony* 934); Theseus and Alexander, according to Plutarch, offered sacrifices to *Phóbos*. Similarly the Romans spoke of *Metus* (fear) and *Formido* (terror): see Vergil, *Aeneid* VI, 276; XII, 335. Greek, like Semitic languages, illustrates the connection of fear with religion: *sebas* and its cognate verbs *sebomai* and *sebazomai* have no religious connotation in Homer: they refer to amazement, shame, scruple, fear; later, (Pindar, Plato) they come to refer to religious reverence and worship. Similarly, *phóbos* and its cognate verb *phobeomai* originally meant only 'fear' and 'to fear' (in Homer, to put to flight), but eventually they acquired the meaning of religious devotion and piety: so already in Isocrates and Plato, and frequently in the Septuagint (notably in the Apocrypha). Thus the Gentiles attracted to Judaism were named *sebómenoi tòn theón* (Josephus, *Antiquities,* XIV, 7, 2 [§110]; Acts xiii, 43, 50; etc.) or *phoboúmenoi tòn theón* (Acts xiii, 16, 26; etc.).[6] Such a 'God-fearing' person is called *deum metuens* in Latin (*Corpus inscript. latinarum* VI, Nos. 29759, 29760, 29763) and *yerê' šamayim* in Hebrew (*Mekhilta, ad* Exod. xxii, 20); here 'fearing Heaven' means of course 'fearing the Lord' ('Heaven' is first used for 'the Lord' in Dan. iv, 23).

In ordinary life, as also in religion, a sense of fear unless it reaches the intensity of paralyzing panic produces one of two reactions: either flight, to put a distance between oneself and the object of fear, or acts of propitiation intended to allay hostility.

The Bible contains many examples of flight inspired by fear of an enemy or a person (or animal) intent on harm. The following references may suffice: Exod. ii, 15; Judges iv, 15; 1 Sam. xxi, 10; xxii, 20; 2 Sam. xv, 14; Amos v, 19. Such flights, to be successful, must result in concealment, often due to mere distance. When fear of God produces flight and concealment we have not yet reached the level of religion, as in the following examples: Gen. iii, 8-10; Jonah i, 3; Isa. ii, 10. But it is futile to attempt to hide from God (Ps. cxxxix, 6-12).

Propitiation, conciliation, expiation, atonement are more significant than flight, and often more effective in overcoming fear inspired by danger. The story in Gen. xxxiii is a good illustration. When met by his brother Esau with four hundred men, Jacob appeased him first by prostrating himself on the

[6] See, e.g., J. Juster: *Les Juifs dans l'empire romain,* I. Paris, 1914, p. 274, n. 6.

ground seven times, then by a rich present of small and large cattle. The sevenfold prostration is regularly mentioned in the Amarna Letters by Egyptian vassals writing to the Pharaoh, e.g., 'At the two feet of the king, my lord, the Sun-god from heaven, seven times, seven times I fall, both prone and supine'.[7] Incidentally we may note that there are parallels between the expressions used in the Amarna Letters in addressing the Pharaoh and some verses in the Psalter addressed to God.[8]

The ancient Israelites, like people in general, feared and honoured persons of higher rank: father and mother (Lev. xix, 3; Deut. v, 16), leaders like Moses and Joshua (Joshua iv, 14), prophets (Deut. xviii, 22; 1 Sam. xii, 18), and kings (2 Sam. xiv, 4; and often). Naturally divine beings and places inspired much greater fear (Gen. xxviii, 17; Judges vi, 22; xiii, 6; xiii, 22 etc.), and God must be honoured far more than kings, although in similar fashion: one serves God (Ps. ii, 11) and one prostrates oneself to him (Ps. v, 7) with fear.

For the deity is the invisible king of the nation and man is but a servant in the presence of the deity. Just as 'the fear of God' means religion, so 'the service of God' means worship: 'Thou shalt fear the Lord thy God, and Him thou shalt serve' (Deut. vi, 13). In many languages the words for 'worship' mean 'work, service.'

> (Socrates). Well, what kind of attention to the gods is holiness?
> (Euthyphro). The kind, Socrates, that servants pay to their masters.
> (Socrates). I understand. It is, you mean, a kind of service to the gods?
> (Euthyphro). Exactly.
> Plato: *Euthyphro,* 13D. Translation by H. N. Fowler.

Beyond doubt this is the earliest notion of worship not only in Israel but all over Western Asia, Egypt, and elsewhere. In Hebrew (*'avodah,* Joshua xxii, 27, cf. 'abd, 'to serve, to worship' in Ugaritic), Aramaic *(pûlḥan),* Akkadian *(dullu),* Greek *(leitourgía, douleía),* Latin *(cultus),* the words for 'worship' mean originally 'work, service'. We still speak of 'divine service' (cf. the German *Gottesdienst*) although we no longer regard worship as the work of servants providing the deity with what it needs. 'Minister' in Latin meant 'a waiter, a servant, a cupbearer' long before it meant a religious functionary, exactly as *diákonos* (deacon) in Greek meant a servant before it meant a religious official.

[7] Translated by W. F. Albright in J. B. Pritchard: *Ancient Near Eastern Texts.* Princeton, 1950, p. 485.
[8] See A. Jirku, *Journal of Biblical Literature,* 52, 1933, pp. 108-120.

The notion that the worshipper is the slave of the deity is particularly stressed in ancient Hittite texts.

> The gods are the masters, men are their servants: that describes the relation between gods and men in the briefest manner. This has two sides: on the one hand the servants owe their master the respect which they manifest in the worship through sacrifices and festivals;...on the other hand the servant must expect punishment if he does not fulfil his obligations or actually behaves in direct opposition to them: the gods will then sit in judgment upon him.[9]

The corollary of this conception is that the deity demands of the worshipper proper respect as well as offerings. This is clearly expressed in the Hittite *Instructions for Temple Officials*.[10]

> Are the minds of men and the gods generally different? No! With regard to the matter with which we are dealing? No! Their minds are exactly alike. When a servant is to stand before his master he is bathed and clothed in clean (garments): he either gives him his food or he gives him his beverage. And because he, his master, eats (and) drinks, he is relaxed in spirit and feels one with him. But if he (the servant) is ever remiss, (if) he is inattentive, his mind is alien to him.

It appears from this that in the religion of the Hittites, and equally in the other early religions, the worship of the gods includes a negative side (purifications) and a positive side (sacrifices and offerings). This second phase is stressed in the second prayer of Mursilis for deliverance from the plague.[11]

> The Hatti land, all of it, is dying; so no one prepares sacrificial loaves and libations for you. The plowmen who used to work the field of the god are dead; so no one works or reaps the field of the god at all. The grinding women who used to make the sacrificial loaves for the gods are dead; so they do not make the sacrificial loaves any longer. From whatever corral (or) sheepfold they used to select the sacrifices of sheep and cattle, the cowherds and the shepherds are dead... So it comes to pass that the sacrificial loaves (and) libations, and the offerings of animals have stopped.

In the Bible the notion that man is the servant of God and therefore must serve him in the worship is presented in two forms. First the primitive notion that God created man to serve him. In the Akkadian Creation Epic (*Enuma eliš* 6, 7-8) Marduk says, 'Verily, savage-man I will create. He shall be charged with the service of the gods that they may be at ease!'[12] Similarly, God created man

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[9] A. Goetze: *Kleinasien*. Munich, 1933, p. 138.
[10] Translation by A. Goetze in Pritchard, *op. cit.* (supra, n. 7), p. 207.
[11] *Ibid.*, p. 396.
[12] Translation by E. A. Speiser in Pritchard, *op. cit.* (supra, n. 7), p. 68.

when 'there was no man to till the ground' (Gen. ii, 5) and 'put him into the garden of Eden to till it and to guard it' (Gen. ii, 15). The other biblical explanation of man's servitude applies only to Israel: 'For unto me the Children of Israel are servants; they are my servants whom I brought forth out of the land of Egypt' (Lev. xxv, 55; cf. xxv, 42).

Worship is the basic element of ancient religions, including Israel's; mere belief in the existence of divine beings does not constitute religion. 'There is no religion where man does not do something about it, even if that something be, as in some of the more advanced Oriental religions, the most concentrated doing nothing'.[13]

As clearly indicated in the Hittite instructions to temple officials quoted above, the service (or worship) of the deity has a negative and a positive side: the servant in the presence of his master is washed and wears clean clothes, and he offers him something to eat and something to drink.

Religion, like high society, has its etiquette: whoever is admitted before a king (and more so before a god) must be spotlessly clean, wear fine garments, and abstain from anything offensive. If the deity appeared suddenly, so that the required purifications and changes of garments could not be carried out, a man covered his face and head (Exod. iii, 6; 1 Kings xix, 13; cf. Koran, Sura 74); to the present day men keep their head covered in orthodox synagogues, and women in Roman Catholic churches. But in regular worship body and garments must be clean, pure: to enter the sanctuary it was necessary to 'sanctify oneself' *(hithqaddeš)* for one (Joshua iii, 5; vii, 13) or two days (Exod. xix, 10), or at least immediately before the sacred ceremony (1 Sam. xvi, 5). This 'sanctification' consisted of a ritual purification accomplished at times through a bath (Lev. xiv, 9; xv, 16; xvii, 15-16; 2 Sam. xi, 2; etc.). This developed into the rite of baptism, and the use of holy water at the doors of Roman Catholic churches, and fountains outside mosques. Such purifications by means of water are common in all ancient religions; the following examples from the Homeric poems may suffice: *Iliad* i, 313-317; vi, 266; xvi, 228-230; xxiv, 302-307; *Odyssey* ii, 261; iv, 750-752; xvii, 48-51. In the last two passages, washing and putting on clean garments precede prayer. Washing garments (Exod. xix, 10) is connected with the ritual bath in Lev. xiv-xvii. The wearing of a linen ephod (a small apron) (1 Sam. ii, 18; 2 Sam. vi, 14), removing one's sandals in the presence of the

[13] G. F. Moore: *The Birth and Growth of Religion*. New York, 1934, p. 17.

deity (Exod. iii, 5; Joshua v, 15), or changing one's garments (Gen. xxxv, 2) were required, as also avoidance of anything regarded as polluting (1 Sam. xxi, 5-6). 'O children of Adam: Wear your goodly apparel when ye repair to any mosque' (Koran, Sura 7, 29). Special rites of purification or a sacrifice were required to remove grave pollution.

The positive side of the worship consists of providing the deity with what it desires. The Bible still preserves remnants of the notion, common to all ancient religions, that the deity requires domestic service like a king: a dwelling with furniture, garments, food, relaxation, and the like. In early days divine beings dwelt in stones as at Bethel ('dwelling of a divine being'), in springs as in Beer-lahai-roi (Gen. xvi, 13-14), and in other natural objects. But later either a tent or a temple was required. As late as 520 B.C., Haggai ascribed a crop failure to the Lord's indignation because the Jews in Jerusalem left the Temple in ruins after building themselves excellent houses (Hag. i, 1-11).

In ancient Egypt the daily divine service in the temples included the following rites: the purification by water of the priest, his entrance into the temple and lighting a fire, the entrance into the adytum bearing a smoking censer, the prostration before the divine image, and the toilet and dressing of the image. Every rite was accompanied by appropriate liturgical sayings. On festivals the sacred image was carried in procession.

The feeding of the deity is universal in all ancient religions. In the Babylonian account of the flood, the gods had become very hungry when no sacrifices could be offered; when the first burnt offering was finally presented, 'the gods smelled the sweet savour, the gods gathered like flies over the sacrificer' (*Gilgamesh Epic* xi, 160-161). A refined echo of this statement occurs in Gen. viii, 21, 'The Lord smelled the sweet savour' (cf. 1 Sam. xxvi, 19; contrast Lev. xxvi, 31; Amos v, 21). The shewbread was placed by the priests on the Lord's table (1 Sam. xxi, 6), a rite which survived even in the Second Temple (Exod. xxv, 30; xxxv 13; xxxix, 36; 2 Chron. iv, 19; etc.). According to Tertullian (died about 230 of our era) a table was set for Juno [Hera] during a whole week (*De anima* 39). But the universal method of providing nourishment for the gods is sacrifice. The most common in ancient Israel is the 'peace offering' (*šelem*, also mentioned in the Ras Shamra texts), in which the animal offered provided a good meal to the worshippers after the deity had been served some parts of it; the meat seems generally to have been boiled for the human guests (1 Sam. ii, 15-16; 1 Kings xix, 21). This was originally a sacred meal partaken by the deity

and the worshippers; conversely, in the burnt offering (*'olah*) the whole animal was burned for the deity.[14]

It was the great merit of the religion of Israel to have roots that reached back to immemorial antiquity: like the other early religions it consisted of fear and longing for the deity, expressed in service. But an even greater merit of this religion was that through the spiritual insight of its great reformers, the prophets from Amos to the Second Isaiah (750-540 B. C.), it not only attained monotheism, but also the realization that God is a father rather than a despot, that as universal creator he needs neither food nor lodging, and demands virtue and honesty rather than offerings. Thus the religion of Israel eventually gave birth, in succession, to the three great monotheistic religions of salvation: Judaism, Christianity, and Islam.

[14] For details of these and other sacrifices or offerings in the Bible, see G. F. Moore, 'Sacrifice' in T. K. Cheyne & J. S. Black: *Encyclopaedia Biblica*, IV. London, 1907, cols. 4183-4233.

On the Water Balance of Lake Huleh and the Huleh Swamps
1942/43—1946/47*

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INTRODUCTION

In an earlier paper,[1] an attempt was made to draw up a water balance for Lake Tiberias. The balance involved the following principal data: (a) measurements of the flow in the Jordan, (b) amount of evaporation from the lake as obtained from a study of heat balance for the lake, (c) an estimate of precipitation over the lake surface, and (d) result of computation of runoff from the catchment by means of an empirical regression equation. The latter empirical method had to be resorted to as no other satisfactory theoretical approach seemed to be available.

In the present paper, a similar attempt will be made to set up a water balance for Lake Huleh and the Huleh Swamps. The terms of the balance will be obtained in the same manner as in the case of Lake Tiberias, except that the problem of evapotranspiration from the Huleh Swamps will require special attention. The period of investigation comprises the hydrological years 1942/43-1946/47 (1 October 1942 to 30 September 1947) during which uninterrupted measurements of the Jordan's discharge both above and below the combined bodies of the lake and the swamps were conducted. The catchment area concerned is that of the Jordan between Huliyoth (see Fig. 1) and the Bridge of the Daughters of Jacob.

For brevity, we shall refer to the combined bodies of Lake Huleh and the Huleh Swamps by the term 'Huleh waters'. Occasionally, the Bridge of the Daughters of Jacob will be referred to as 'the Bridge'.

* The author is indebted to Mr. M. J. Goldschmidt, Director, Hydrological Service, to Mr. M. Gilead, Director, Meteorological Service, and to Mr. N. Rosenan, Chief, Climatological Division, Meteorological Service, for making data available, and in particular for discussions on the subject of the present paper. Thanks are also due to Water Planning for Israel, Ltd., for information.—The Jordan's discharge was measured by the Palestine Land Development Corporation and the Jewish National Fund at Huliyoth, and by the Palestine Electric Corporation and the Palestine Water Commissioner's Department at the Bridge of the Daughters of Jacob.

[1] J. Neumann: On the Water Balance of Lake Tiberias, 1935/36-1946/47, *IEJ*, 3, 1953, pp. 246-249.

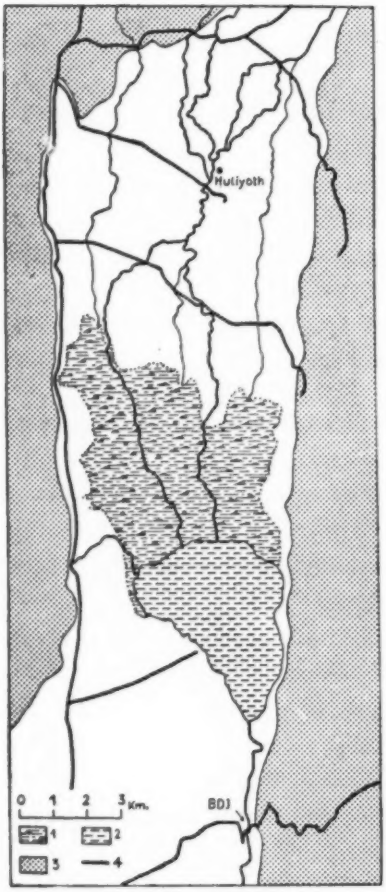

Fig. 1. The Huleh Basin.

1 - Huleh Swamps; 2 - Lake Huleh;
3-surrounding mountain country; 4-roads.
BDJ - Bridge of the Daughters of Jacob.
(Drawn by M. Karmon)

BASIC DATA, OBSERVED AND COMPUTED

Affluent Jordan. According to the Hydrological Service,[2] in the hydrological years 1942/43-1946/47 the mean flow in the Jordan at Huliyoth amounted to 489×10^6 m³/year, or in round numbers, 490×10^6 m³/year.

Precipitation over the Huleh waters. It would appear from an examination of annual precipitation maps for the five years in question that in the area of the Huleh waters mean precipitation was approximately 44 cm/year. In order to express this term as volume of water, one has to know the surface area of the Huleh waters. The surface area of the lake varies comparatively little from winter to summer. It is about 14 km² during the precipitation season, i.e. roughly from November to March. The swamp area, however, varies considerably. According to information received from Water Planning for Israel, Ltd., the swamp area varies from some 54 km² late in winter to approximately 7 km² late in summer. From the simple sine function $30.5 + 23.5 \sin (45° + t)$ suggested below[3] to represent the annual variation of swamp area in km², this area seems to be about 46 km² in January, at the height of the precipitation season.[4] Thus the combined surface area of the Huleh waters during the precipi-

[2] Israel Hydrological Service: *Hydrological Year-Book of Israel, 1947/48-1949/50.* Jerusalem, 1952, pp. 22-23.

[3] Cf. infra, pp. 53 ff.

[4] For rainfall figures, cf. Israel Meteorological Service: *Climatological Normals,* I. Meteorol. Notes, Ser. A, No. 3. Jerusalem, 1952, p. 3.

tation season is estimated as 46 (swamps) + 14 (lake) = 60 km². At a rate of precipitation of 44 cm/year, the resulting precipitation volume is just under 26×10^6 m³/year, or in round numbers, 25×10^6 m³/year.

Total runoff from the catchment. At the suggestion of N. Rosenan, an empirical regression formula

$$q = 0.6P - 12 \qquad (1)$$

was devised[5] for estimating runoff roughly, or rather, what seems to be total runoff (surface + underground) from a catchment whose annual precipitation is P, in cm. In the equation, q is the runoff coefficient, that is to say, runoff expressed as a percentage of precipitation. Thus, in order to estimate runoff from the catchment between Huliyoth and the Bridge of the Daughters of Jacob by means of equation (1), we first have to evaluate precipitation for that catchment.

The Hydrological Service[6] has published the following precipitation data for the hydrological years 1942/43-1946/47:

TABLE 1

Catchment of the Jordan	Area km²	Mean precipitation cm.
To the Bridge of the Daughters of Jacob	1,530	86.2
To Huliyoth only	840	100

Taking weighted averages of the figures in Table 1, mean precipitation for the catchment between Huliyoth and the Bridge works out to have been 69.4 cm/year, the area of the catchment being 690 km². From the latter we have to subtract the surface area of the Huleh waters which we have taken above as 60 km², leaving a land catchment area for the Jordan between Huliyoth and the Bridge of 630 km². Considering that precipitation over the Huleh waters was found to have been 44 cm/year, precipitation over the catchment in question is obtained as $(69.4 \times 690 - 44 \times 60)/(690\text{-}60)$, or very nearly 71 cm/year. For this precipitation value, equation (1) gives a runoff coefficient of 31%, or a runoff of 22 cm/year. Since the catchment area is 630 km², the resulting, computed, runoff volume is about 139×10^6 m³/year, or in round figures 140×10^6 m³/year.

[5] J. Neumann: *Evaporation in Israel and in the Catchment of the River Jordan.* Lecture given on 29 September 1953 at the foundation meeting of the Israel Association for the Advancement of Science.
[6] *Op. cit.* (supra, n. 2), pp. 22-25.

The above result implies that in the catchment area between Huliyoth and the Bridge, evapotranspiration from the vegetation and the soil amounted to something like 310×10^6 m³/year, or 49 cm/year.

TABLE 2

Month	Evaporation from the lake, cm.	Evapotranspiration from the swamps, cm.
January	5.0	4.5
February	5.0	4.5
March	7.5	7.0
April	14.5	13.0
May	20.5	18.5
June	25.0	22.5
July	28.5	25.5
August	23.0	20.5
September	17.5	16.0
October	13.0	11.5
November	5.5	5.0
December	2.5	2.0
Yearly total (rounded off)	168.0	150.0

Evaporation from the lake and evapotranspiration from the swamps. From a study[7] of the heat balance of Lake Huleh, the following average monthly amounts have been deducted (Table 2).

The figures in the last column of Table 2 for evapotranspiration from the swamps are the figures for evaporation from the lake reduced by 10%. This procedure is justified on the following grounds.

For a given rate of solar radiation, evapotranspiration from an extensive vegetation surface well supplied with water amounts to about 75% of the evaporation from an 'adjacent' extensive water surface.[8] The heat balance study[9] has found that without the Jordan, which exports a certain amount of heat from Lake Huleh, evaporation from the lake would amount to 175 cm/year. Therefore, if the Huleh Swamps were completely overgrown by vegetation, evapotranspiration from them should amount to 75% of the evaporation from the lake, that is, to $0.75 \times 175 \approx 130$ cm/year. But not all of the swamps area is overgrown by vegetation, and we therefore suggest taking 150 cm/year for the rate of evapotranspiration from the swamps, a figure which is intermediate between the rates calculated for the lake and a vegetation surface well supplied with water, respectively. As this intermediate rate is just about 10% less than the rate of evaporation from Lake Huleh, allowing for the effect of the Jordan, we have reduced the monthly evap-

[7] J. Neumann: Energy Balance of and Evaporation from Sweet Water Lakes of the Jordan Rift, *BRCI*, 2, 1953, pp. 337-357. [8] H. L. Penman: Physics in Agriculture, *Journ. f. Scient. Instr.*, 25, 1948, pp. 425-432; J. Neumann: On a Relationship between Evaporation and Evapotranspiration, *Bull. Amer. Meteorol. Soc.*, 34, 1953, pp. 454-457. [9] Neumann, *op. cit.* (supra, n. 7).

oration figures for the lake in Table 2 by 10%, in order to arrive at an estimate of the evapotranspiration from the swamps.

To obtain the total annual volume of evaporation and evapotranspiration from the Huleh waters, we have to consider the evaporation figures in Table 2 in conjunction with monthly figures for the surface areas of the lake and swamps, respectively.

The case of the swamps will be considered first.[10] As mentioned above, a representative figure for the maximum area of the swamps late in winter is 54 km², whereas the similar figure for the minimum area toward the end of summer is 7 km². We shall approximate this annual variation by a simple sine function which gives the maximum area of 54 km² for the end of February and the minimum area of 7 km² for the end of August. As we usually work with monthly figures and the monthly figures may be assumed to be valid at mid-month, we shall count time t from mid-January, *i.e.,* at mid-January $t = 0°$, if time is expressed in terms of angles (one year 360°, one month 30°), or $t = 0$, if time is expressed in terms of radians (one year 2π, one month $2\pi/12$). The simple sine function in question is

$$A_S(t) = 30.5 + 23.5 \sin (45° + t), \tag{2}$$

where $A_S(t)$ denotes the area of swamps, in km², at time t. By Fourier analysis, the evapotranspiration figures in the last column of Table 2, may be represented as

$$E_S(t) = 12.5 + 10.8 \sin (275° + t) + 1.3 \cos 2t, \tag{3}$$

where $E_S(t)$ stands for the amount of evapotranspiration in cm. from the swamps during a one-month long period centered at time t. To evaluate the *annual* volume of evapotranspiration, we have to multiply the function for evapotranspiration [equation (3)] by the function for area [equation (2)] and integrate with respect to time between the limits $t = 0$ and $t = 2\pi$, when the annual volume of evapotranspiration from the swamps E_S^* is found to be

$$E_S^* = \frac{12 \times 10^4}{2\pi} \int_0^{2\pi} E_S(t)\, A_S(t)\, dt. \tag{4}$$

[10] In an earlier, typewritten, version of the present study, the volume of evapotranspiration from the swamps was computed using the figure for the *annual mean* of the swamp area. However, Mr. M. Goldschmidt has directed the writer's attention to the need to allow for the large variation from its mean of the swamp area in the course of an annual cycle. In this connection, special thanks are due to Mr. Goldschmidt for constructive criticism.

In (4), the numerical factor $1/2\pi$ yields the average *monthly* volume of evapotranspiration, the factor 12 gives the annual volume and, lastly, the factor 10^4 converts the result into cubic metres.

If we insert in (4) the expressions under equations (2) and (3) and integrate, several of the terms vanish. We find that

$$E_S^* = \frac{12\times10^4}{2\pi}\left\{381\int_0^{2\pi} dt + 254\int_0^{2\pi}\sin(275°+t)\sin(45°+t)\,dt\right\} \tag{5}$$

$$= \frac{12\times10^4}{2\pi}\left[762\pi - 254\,(\cos 50°)\pi\right] \tag{6}$$

$$= 36\times10^6.$$

We have thus found that the annual volume of evapotranspiration from the Huleh Swamps is 36×10^6 m³/year.

For evaluating the annual volume of evaporation from the lake, we shall follow the same procedure. According to Water Planning for Israel, Ltd., the surface area of the lake at its maximum late in winter is 14 km², whereas at its minimum late in summer the area is 12.5 km². On the analogy of (2), the annual variation of lake surface area will be expressed by

$$A_L(t) = 13.25 + 0.75\sin(45°+t), \tag{7}$$

where $A_L(t)$ is the lake surface area, again in km². Like the annual variation of evapotranspiration from the swamps, the annual variation of monthly amounts of evaporation from the lake may be obtained on the analogy of equation (3):

$$E_L(t) = 14 + 12\sin(275°+t) + 1.4\cos 2t, \tag{8}$$

where $E_L(t)$ is in cm/month.

Similarly to (4), the *annual volume* of evaporation E_L^* from the lake is obtained as

$$E_L^* = \frac{12\times10^4}{2\pi}\int_0^{2\pi} E_L(t)\,A_L(t)\,dt. \tag{9}$$

If in equation (9), we introduce equations (7) and (8) and integrate, the result is

$$E_L^* = 22 \times 10^6 \text{ m}^3/\text{year}, \tag{10}$$

that is, the annual volume of evaporation from Lake Huleh is 22×10^6 m³/year. The total annual volume of evaporation and evapotranspiration E^* from the Huleh waters amounts to

$$E^* = E_S^* + E_L^*$$

or, in round figures, 60×10^6 m³/year.

Changes in lake level. According to information received from the Hydrological Service, on 1 October 1942 the lake level was at +67.09 m. and on 1 October 1947 at + 67.02 m.: the mean annual change in lake level reached -1.4 cm. Since this loss is part of the general water loss from the Huleh waters, it will not appear as a separate item in the balance sheet set forth below.

BALANCE SHEET OF LAKE HULEH AND THE HULEH SWAMPS

Using the data listed in the foregoing section, we arrive at the following balance sheet for the Huleh waters:

MEAN ANNUAL WATER BALANCE OF LAKE HULEH AND THE HULEH SWAMPS 1942/43—1946/47 (in units of 10^6 m³)

Gains		*Losses*	
Jordan inflow at Huliyoth . . .	490	Evaporation from Lake Huleh[11] .	25
Precipitation over the lake and swamp area	25	Evapotranspiration from Huleh Swamps[12]	35
Runoff from catchment between Huliyoth and the Bridge of the Daughters of Jacob	140	Balance (= computed total outflow)	595
	655		655

Thus, for the period considered, the *computed* total outflow is 595×10^6 m³/year. During the same period the mean outflow in the Jordan *measured* at the Bridge of the Daughters of Jacob amounted to 590×10^6 m³/year. Hence, if it is assumed that the underground inflow and outflow to and from the catchment are small, or rather, if it is assumed that the net underground outflow is small, then the accord between the computed and measured outflows may be said to be excellent. Nominally, the agreement is within 1%.

[11] Figure slightly rounded off upward.

[12] Figure slightly rounded off downward.

DISCUSSION

As pointed out also in the study of the water balance of Lake Tiberias[13] the close accord between the computed and measured outflows may be fortuitous, since all terms of the water balance, whether measured or computed, are subject to errors. However, the fact that the same methods applied to different sets of data lead to good agreement between the measured and computed outflows, gives some encouragement that the results are not entirely fortuitous. Further, as was pointed out in the study[14] concerning Lake Tiberias, it is not impossible that the close accord was obtained by chance as a result of ignoring possible underground inflows and outflows from and to adjacent catchments. A final settlement of this question awaits improved knowledge of the hydrogeology of the region.

A question which merits special discussion is the question of evapotranspiration from the swamps. Several estimates are in circulation concerning the magnitude of evapotranspiration from the Huleh Swamps. Some of them are *greatly* in excess of the figure (36×10^6 m^3/year) arrived at in the present paper. Most of these estimates are based on the belief that transpiration from the large and numerous leaves of the papyrus, which grows thickly over most of the swamps, is responsible for heavy water losses. And, occasionally, results of transpiration measurements from single papyrus leaves are cited to indicate large transpiration rates. However, these large estimates overlook the fact that transpiration, just like 'ordinary' evaporation, requires heat to provide the evaporating waters with the necessary heat of vaporization. A single leaf of papyrus in non-natural exposure, or a solitary papyrus plant, even a cluster of a few papyrus plants, may be able to draw heat not only from solar radiation but also from air coming from heated land surfaces. This process, which is called 'horizontal advection of heat', will manifest itself in increased rates of transpiration from the plants in question. The source of this extra amount of heat is solar radiation incident *outside* the plant surface. But, for an extensive vegetation (or water) surface, the primary source of heat is the solar radiation incident *in situ*. Moreover, if it is desired to make a comparison between evapotranspiration rates from a swamp overgrown with vegetation and evaporation rates from an open water surface, then it should be pointed out that there are cogent reasons for believing that at a given rate of solar radiation, *less radiation is absorbed by plants, in general,*

[13] Neumann, *op. cit.* (supra, n. 1). [14] *Ibid.*

than by a water surface, and in consequence, evapotranspiration rates from a swamp will be smaller than evaporation rates from an adjacent open water surface. The 'cogent reasons' referred to reside in the different optical properties of plant and water surfaces, respectively. For solar radiation, plants have an albedo, *i.e.* reflectivity, of between 10 and 33%, whereas the albedo of water surfaces is considerably lower. Restricting attention to averages for the different solar altitudes occurring in the course of an annual cycle, the albedo of water surfaces varies between 3 and 10%, the values being dependent on geographical latitude. Hence, for a given rate of solar radiation, more of the radiation will be reflected, that is, less heat will be available for plants compared with a water surface. This was the reason which led Penman[15] to estimate that evapotranspiration from a vegetation well supplied with water (Thornthwaite's[16] 'potential evapotranspiration') amounts to about 75% of the evaporation from an open water surface. Nor do we have any reason to assume that solar radiation rates for the Huleh Swamps are greater than for Lake Huleh, and one may therefore justifiably expect evapotranspiration rates from the Huleh Swamps to be smaller than evaporation rates from the lake.

We will conclude by citing two examples indicating that a profusely growing vegetation can thrive on quantities of water which cannot be considered to be excessive. The first example is offered by estimates of the evapotranspiration from the great swamps of the Nile on the Bahr el-Jebel and Bahr el-Ghazal in Southern Sudan (7°N to 9°N, astride 30°E). Extensive areas of these swamps are thickly overgrown by papyrus. For several years the evapotranspiration was measured from a tank 10 m. × 10 m., that is, of a size which is greater than used in most lysimeter experiments. Hurst writes in this connection:[17]

> ... At first the papyrus was never as flourishing in the tank than outside it, and transpiration was not as great as would be expected from experiments elsewhere. On the advice of the botanist, however, the method of planting and culture of the papyrus was altered, with the result that it now grows more vigorously and transpires an amount more nearly approaching what would be expected.

Hurst and Phillips[18] who summed up the results of six years of experiments, find that evapotranspiration from the tank amounted to 132 cm/year.

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[15] Penman, *op. cit.* (supra, n. 8).

[16] C. W. Thornthwaite: An Approach toward a Rational Classification of Climate, *Geogr. Review,* 38, 1948, pp. 55-94.

[17] H. E. Hurst: *The Nile.* London, 1952, p. 117.

[18] Cf. N. Rosenan: *Progress Report on Problems Connected with Evaporation and its Assessment.* Manuscript. Ha-Qirya, 1952.

The second example is offered by the case of the tropical rain forests. Over much of the tropical rain forests, precipitation amounts to between 100 and 200 cm/year. Yet, this precipitation is not only capable of maintaining a luxuriant vegetation but also feeds great rivers, which indicates that these forests thrive on an evapotranspiration well below 200 cm/year.

SUMMARY

THE water balance of Lake Huleh and the Huleh Swamps for the period 1942/43-1946/47 has been studied. The principal terms of the mean annual water balance are as follows (figures in brackets give volumes of water in units of 10^6 m³/year): (a) inflow in the Jordan at Huliyoth (490)—as measured by the Hydrological Services, (b) precipitation over the lake and swamps (25)—estimated from annual precipitation maps of the region, (c) runoff from catchment between Huliyoth and the Bridge of the Daughters of Jacob (140)—computed from an empirical regression equation, (d) evapotranspiration from the swamps (35), and (e) evaporation from the lake (25). Both (d) and (e) were obtained by utilizing the results of an earlier heat balance study for the lake.

The computed total outflow amounts to 595×10^6 m³/year which compares with a measured outflow at the Bridge of the Daughters of Jacob amounting to 590×10^6 m³/year.

The question of evapotranspiration from the swamps is considered in some detail. It is shown that evapotranspiration rates from an extensive vegetation surface, such as occurs in the swamps, should be smaller than from an adjacent open water surface. In this, it was assumed that solar radiation rates are similar.

P. S. Drs. A. Avishur and F. Mero of Water Planning for Israel, Ltd., have pointed out to the author that the figures for the Jordan's discharge at Huliyoth are low compared with the sum total of discharges of rivers Snir, Dan and Hermon, whose confluence a short distance upstream of Huliyoth forms the Jordan. The deficit appears to be about 30×10^6 m³/year. The resulting agreement between the computed and measured outflows at the Bridge of the Daughters of Jacob would be thus reduced to a nominal value of about 7 per cent. This figure should be compared with the agreement of a nominal value which we did not trust too much (cf. supra, p. 56).

Can we rely on estimates of evaporation, evapotranspiration, rainfall and runoff from the catchment as calculated in this paper? The author has several times considered this question and discussed it with his colleagues. Certain evaporation measurements conducted by the Meteorological Service at Sde Nahum and various evaporation and evapotranspiration calculations carried out by N. Rosenan lately, indicate that at present there is little one can improve on the figures of evaporation and evapotranspiration given for the Huleh waters. On the other hand, estimates of rainfall over and runoff from the catchment as obtained from the empirical Equation (1) are subject to uncertainties, the magnitude of which it is difficult to assess.

HEBREW BOOKS AND PAPERS

Books

Ojar ha-Megilloth ha-Genuzoth (Thesaurus of Hidden Scrolls) in the possession of the Hebrew University; deciphered, copied and provided with a preface by the late E. L. Sukenik; prepared for publication by N. Avigad. Jerusalem: Bialik Institute, 1954. 40 pp. 58 Pls. with transcription, 30 illustrations.

This is the long-awaited complete publication of the Dead Sea scrolls acquired by the Hebrew University in 1947, of which only a few specimen pages were published during Prof. Sukenik's lifetime. The publication includes the prefaces to the two preliminary publications combined into one introduction, with a description of the scrolls added by the editor. This is followed by a transcription of the texts together with collotype reproductions of the scrolls themselves, which consist of the Isaiah scroll in the possession of the University (15 Pls.), the 'War of the Sons of Light and the Sons of Darkness' (19 Pls.) and the 'Thanksgiving Hymns' (24 Pls., some containing numerous small fragments).

Encyclopaedia Miqraith, II. Beth to Zayin. Jerusalem: Bialik Institute, 1954. 951 pp., 24 Pls., maps in colour, figs.

This is the second volume of the Encyclopaedia (for a note on the first, see *IEJ*, 3, 1953, p. 57), and comprises a further six letters, of which Beth is the longest. This volume was edited by the late Professor U. M. D. Cassuto, and by Professors N. H. Tur-Sinai, B. Mazar and Mr. S. Yeivin. The articles include the many topographical features beginning with Beth, and an item of 117 columns on 'Building'. Other noteworthy items are: Gebal (Byblos), Gozan, Gezer, Roads (with a coloured map in relief) and Hellenism, as well as 48 columns on the Religion of Israel. The high standard of illustration, bibliography and general editing of the work is maintained in this second volume.

Shishah Sidrey Mishnah: Mo'ed, Neziqin, Nashim. (The Six Orders of the Mishnah, parts I-III.) With a commentary by H. Albeck, vocalization and punctuation by H. Yalon. Jerusalem: Bialik Institute, 1952-54.

This new edition of the text of the Mishnah is based on the textual criticism of the late Prof. Epstein; the text has been vocalized throughout to make for easy reading, although some of the readings thus obtained are of course controversial. Still more important (as most non-Talmudists know to their sorrow) is the question of punctuation, which has to be supplied in the ancient manuscripts. The commentary leans in the traditional direction: when the six volumes are completed, the editors promise to provide another volume of *realia*. Although this is not *the* critical edition of the Mishnah that we need so much, it is certainly a step in the right direction.

Malamat, A.: *The Aramaeans in Aram Naharayim and the Rise of their States.* Jerusalem: Israel Exploration Society, 1952. 76 pp., 1 map. Mimeographed.

This study is a doctoral dissertation (written under the supervision of Prof. B. Mazar), and deals with the history of the

Aramaeans between the 12th and 9th centuries B.C., i. e. from their first appearance in cuneiform sources to the disintegration of their states before the expanding Assyrian Empire. The first two parts discuss the Assyrian records, including the more recently found annals of Ashurbêlkâla and Ashurdân II. The third part deals with the foundation and expansion of the Aramaean states along the banks of the Euphrates and Habur, and includes the epigraphical and archaeological evidence from such sites as Gozan (Tell Halaf), Bît Adini, etc. An appendix on Israel and Aram Ṣoba discusses the Aramaean wars of Saul and David, and a possible Assyro-Israelite synchronism.

Papers

ARCHAEOLOGY

Architecture — S. Yeivin publishes the first part of a study on the 'Fortifications in Israel in Antiquity' (*Ma'arakhot*, 1954, pp. 36-59); this part deals with the pre-Israelite fortifications from the Neolithic to the Late Bronze Age and includes the new evidence from Jericho (Neolithic), Rosh ha-Niqrah (Early Bronze) and Beth Yerah (Middle Bronze).

Pottery — J. Kaplan deals with two peculiarly shaped vessels of the Chalcolithic period. One of these has a tubular body, two lug handles at its extremities and a large funnel set up vertically in the centre of the tube; he regards it as a milk churn hung on strings from the two handles and swung to and fro. The other vessel, usually called a 'bird-shaped vase', is identified as a vessel for transporting water on journeys. (*BIES*, 18, 1954, pp. 60-63.)

Survey — J. Olamy describes the Prehistoric caves of Farsh el-'Iraq on Mount Carmel, surveyed as part of the general prehistoric survey of the Carmel, which is now in progress. The five caves are situated 7 km. south of Haifa (at 1478. 2420) and have suffered much from natural causes; the principal finds were made in the terrace of cave D, mainly flint implements of Levallois-Mousterian type. 134 of these were collected and classified. (*BIES*, 18, pp. 71-78.)

N. Zori publishes the first part of an archaeological survey of the Beth-Shan Valley, dealing this time with the section along the Jordan from Gesher in the north to the Ḥarod River in the south. Fourty-seven sites were visited and classified as follows: settled from Prehistoric to later times, 19; Prehistoric to Israelite only, 11; Hellenistic and later only, 10; milestones, 4; natural hills, 2. (*BIES*, 18, 1954, pp. 78-90.)

HISTORY

In *Zion* (19, 1954, pp. 23-56) S. Applebaum studies the Jews of Cyrenaica and their revolt under Trajan. The study is based not only on the historical literature, but also on the epigraphical evidence, including the latest finds made during the British administration of Libya. A plan of the city of Cyrene shows the various buildings connected with the revolt; a map of Cyrenaica indicates the location of the Jewish settlements as revealed by discoveries or suggested by local traditions (the author carefully distinguishes between the two sources). Two appendices are added, one giving in full the evidence for the Jewish settlements in Cyrene, the other a very comprehensive bibliography (102 items).

REVIEWS

Tufnell, Olga: *Lachish III (Tell ed-Duweir): The Iron Age.* With contributions by Margaret A. Murray & D. Diringer. London: Oxford University Press, 1953. 2 vols.: Text 437 pp.; Plates 8 pp. + 130 plates and plans. £8. 8*s*. 0*d*.

Lachish III is without doubt the most important and exhaustive study so far to be published of the material culture of Palestine during the Iron Age, owing to the extremely rich material found on the mound, the systematic recording in the field, the meticulous analytical and comparative method of study and the comprehensive and lucid presentation.

The *Introduction* deals with the history of the expedition, the identification of the Iron Age sites associated with Lachish in certain topographical passages of the Bible, and with the geographical position of the tell, all matters pertinent to its identification. The introduction concludes with a summary of the principal literary sources on ancient Lachish.

Part I 'History and Archaeology' comprises a survey of the archaeological aspects and typical features of each phase, fitting them into the historical framework. This task is not always easy; the results indeed were many, but they are somewhat inconclusive, undoubtedly because of the sudden interruption of the work on the tragic death of J. L. Starkey. Thus, the historical reconstruction undertaken by the author is as yet tentative.

Part II 'The City' deals with the stratification of the site. This, too, is as yet unclear in many respects. This section also contains a careful account of the architectural features including the Iron Age Citadel, fortifications, houses and the post-exilic remains. Owing to the ingenuity of the excavators, three separate building phases were distinguished in the construction of the platforms which served as foundations for the Iron Age Palace-forts. Of the superstructures of Palace A no traces remain and those of Palaces B and C are only distinguished by a few burnt patches of plastered floors. On the ruins of these structures was built the well planned and spacious Persian residence. A new and striking parallel to it may be seen in a public building uncovered in stratum VI (the Persian period) at Tell Qasile. Only part of the plan of this building has so far been published (*IEJ*, 1, 1950-51, p. 70, Fig. 2). Another isolated building of some interest is the so-called 'Solar Shrine' at Lachish, which owes its name to its east-west orientation and to the presence of an altar. The initial date of the building is not clear, but it was still in use in the second century B.C. The date of the important city gate and the comparative dates of the different sections of the magnificent Iron Age city walls cannot be conclusively established until further investigation.

More excavation will also be needed to clear up the comparatively unknown history of the town during the Early Iron Age. There seems to have been a period of partial desertion, lasting till c. 1000 B.C. Of special importance in this phase are a few Philistine sherds and two tombs containing anthropomorphic coffins (as yet unpublished).

Level V has only been tentatively sounded; it is dated to 1000-900 B.C. To this

level may belong the podium of Palace A attributed to the period of the United Monarchy. The Judaean city was afterwards well fortified by Rehoboam against a possible attack from the south.

In Level IV (9th century B.C.) the city expanded under Asa and Jehoshaphat, the citadel was enlarged and the walls rebuilt. Hezekiah probably built the additional defences and a big shaft of Level III against the Assyrian menace. The excavation verified the version of the fall of Lachish depicted in the Nineveh reliefs. The city was completely destroyed by Sennacherib in 700 B.C.

The new city of Level II belongs to the 7th century B.C. and was destroyed in its turn by the Babylonians in 588 B.C. The excavator suggests another period of desertion after this destruction, lasting until 450 B.C. The topmost level (I) belongs to the time of the return from Babylon. After Alexander's conquest, the city deteriorated until its final abandonment, c. 150 B.C.

Part III. The third part of the book deals with the cemeteries and miscellaneous structural features on the surrounding slopes of the tell, including a complete account of the structural features of the tombs, accompanied by a full register of finds and lists of comparative material. Four large burial deposits represent a consecutive series of pottery and other objects from c. 925 B.C. to 588 B.C.; they are used as a chronological guide to build up the sequence of the rich tomb groups (p. 50).

Part IV deals with the objects by categories. The first and major chapter is an excellent presentation of the Middle Iron Age pottery. The pottery finds from the stratified city levels and the tomb groups are treated together and supplement each other in many respects. Typologically the well preserved tomb material helped to identify and reconstruct the mostly incomplete specimens from the city levels.

Of this rich material Miss Tufnell has made a detailed analytical study which will without doubt become the standard reference work on Middle Iron Age pottery. The pottery has been arranged into main classes and into subdivisions, according to type, function, manufacture and finish. The development of each type has been closely traced, its distribution and frequency of forms recorded in charts, and full comparative material added from the main published sites in Palestine and elsewhere, including the very pertinent but still unpublished Samaria material.

The presentation of the pottery series starts with the open forms of the bowl types, which are the simplest as well as the most common of all ceramic shapes. However, as Miss Tufnell notes, these are also the most difficult and frustrating to classify. The bowls are divided into three main classes and eleven subdivisions, taking into account the very smallest variation in shape and technique. Added to this is an analysis of the burnish on the bowls, following the transition from hand-burnishing and using it as a chronological guide. The result of this analysis shows that the use of wheel-burnish was introduced at about the beginning of the 9th century B.C. and replaced hand-burnishing completely at the end of the 8th century. These conclusions agree on the whole with similar develop-

ments on other sites (Tell Beit Mirsim Level A, Megiddo Levels IV, III, Qasile Levels VIII, VII). A hypothetic chronological sequence is based on all the above mentioned facts, which are also shown graphically in a concise distribution chart (p. 325).

The author's extreme conscientiousness in the presentation of all the evidence and a proliferation of detail at times obscure the general outlines of the subject. Moreover the published excavation reports on other sites are sometimes taken at their face value, without reference to subsequent corrections. A striking example is the use of a far too high dating of Megiddo Level V, as given by the excavators, namely 1050-1000 B.C. It has since been proved by Albright (*AASOR*, 21-22, 1943, p. 29, n. 10) that this level is identical with Level IVB and the now generally accepted date for Level V A - IV B is c. 950-920 B.C. Such wrong attributions distort some aspects of the ceramic classification. Another source of error is the occasional inconsistency of the dates given to the various loci; sometimes there are even differences between them in the various places where they are mentioned.

Diringer in his chapter on the *Early Hebrew Inscriptions* presents a newly revised transliteration and translation of the famous Lachish ostraca, in the light of the large amount of literature published since 1938 (a full bibliography is given on pp. 21-23). Of special interest is his detailed study of the large collection of the controversial *la-melekh* stamps. He divides the stamps epigraphically and typologically into three groups, assigning them respectively to the beginning or middle of the 8th century, the end of the 8th century, and the 7th century B.C. The site has also produced a remarkable collection of weights, six of which are inscribed with early Hebrew letters As they were not found in a stratified context, Diringer tries to date them to the 7th-6th centuries B.C. by comparing them with his classification of the *la-melekh* stamps.

As can be seen from this necessarily very general survey, Miss Tufnell and her collaborators have done everything to make the book as perfect as possible. The publication is of a very high standard, but unfortunately the same cannot be said of the drawings and photographs of pottery. This blemish should not, however, diminish our appreciation of the lasting value of the work.

TRUDE K. DOTHAN

Hirschberg, J.W.: The Sources of Moslem Traditions Concerning Jerusalem, *Rocznik Orientalistyczny*, 17, 1951-52, pp. 314-350.

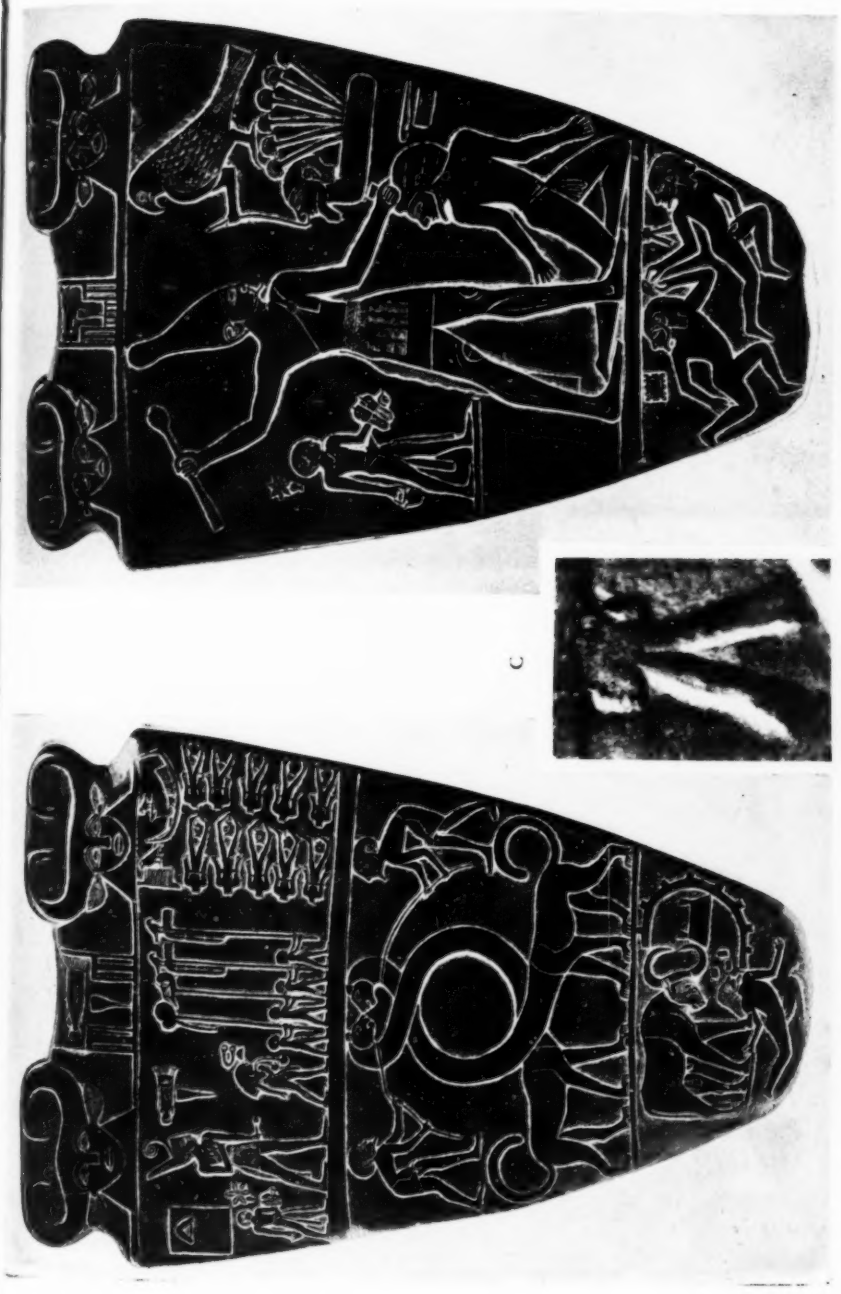
According to Moslem tradition, Jerusalem's sanctity is second only to that of Mecca, and a considerable number of legends, most of them based on Jewish lore, used to be told of various places in this Holy City. The focus of interest was, naturally enough, the spot on which the Dome of the Rock had been erected and the places in its immediate vicinity. The Dome was often associated with the navel-of-the-world conception, which Dr. Hirschberg tries successfully to analyse with reference to both Jewish and Moslem traditions.

The work under review (published in the Yearbook of the Polish Oriental Society) is a thorough study of the traditions relating to Jerusalem. On the assumption that Jerusalem's connection with Islam is less obvious than its connection with Judaism and Christianity, the author methodically examines and classifies the various Moslem traditions referring to Jerusalem, and tries to establish their origin.

Of particular interest is the author's treatment of the traditions relating to Muḥammad's ascent to Heaven. Most previous scholars have directed their research towards the *ḥadîth* or Moslem tradition; Dr. Hirschberg attempts to find a solution by returning mainly to the Qur'ân itself. He explains Muḥammad's hint that he had been to Jerusalem as follows: (a) Jewish legends, then still widespread, convinced him of Jerusalem's importance; (b) according to Jewish opinion, no true prophetic words could be uttered outside the Holy Land. Jewish influence, the author maintains, could hardly be entirely absent in just this one legend, when it is predominant in every other important *ḥadîth* connected with Jerusalem. This, although not conclusive, is highly suggestive.

The study under review is the result of laborious work, accomplished through a painstaking sifting of the relevant Moslem traditions and their by no means easy comparison with Jewish ones. Dr. Hirschberg's footnotes are an indication of the vast amount of work involved in such research. However, one may wonder why the reference given for the attempt made in the days of the Emperor Julian to rebuild the Temple (p. 323) is based on one secondary source, when the reader naturally expects to find the primary sources (or, perhaps, no source at all for such a famous event). One may also ask why, in support of his statement that one of K. A. C. Creswell's theories was disproved by excavations, the author refers in the footnote (p. 334) only to Creswell's work, and not to the report on the excavations itself. These instances, however, are exceptions in the erudite, well-balanced *apparatus criticus* which adds weight to Dr. Hirschberg's study.

J. M. LANDAU



B

C

A

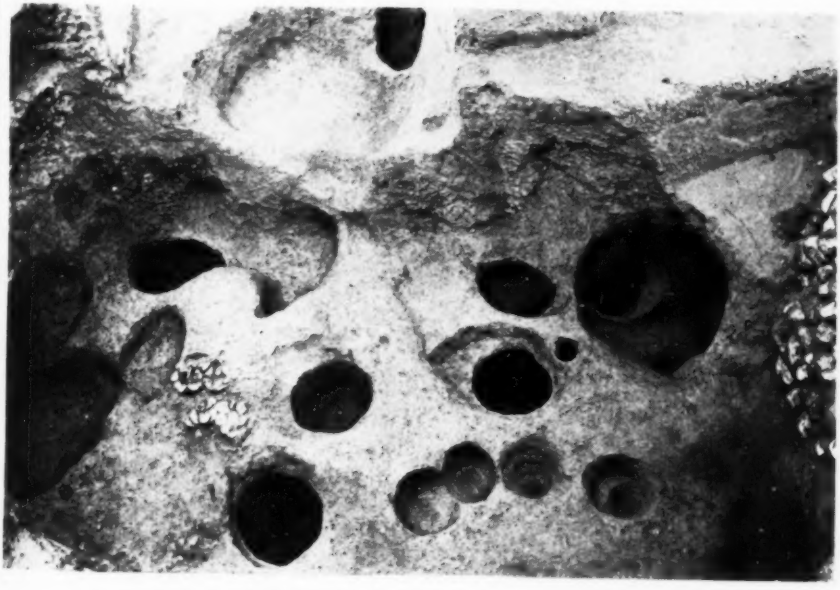
King Narmer's palette. A: Obverse, B: Reverse, C: Detail of Reverse.

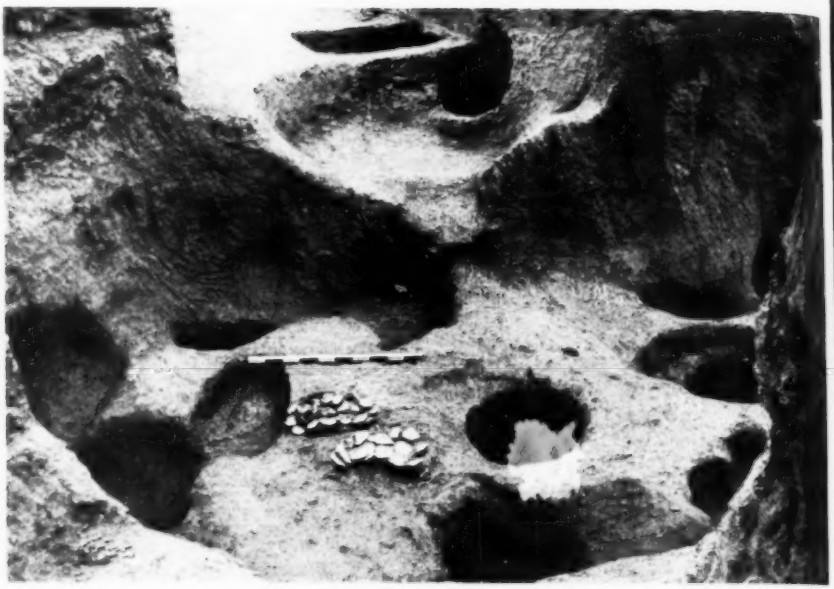
A: Aerial view of Abu Matar at the end of the second campaign. *(Photo Israel Air Force)*

B: General view of the site in the course of excavation, from the wadi.

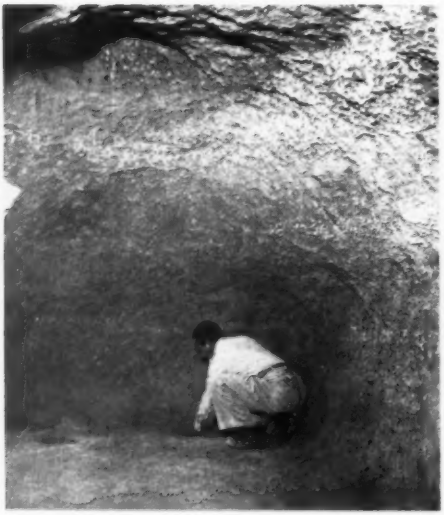
A: Partial view of the excavation.

B: The floor of dwelling 127.

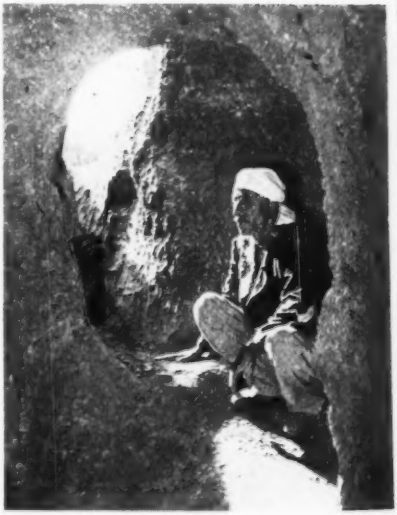




A: Lateral view of 127, looking towards 125-126.



B: Interior of dwelling 128.



C: Entrance to dwelling 128.

A: Tunnel 153 a, built of stones inside silo 153 b.

B: Niche 126 and the round window opening onto 128.

PLATE 6

A: Dwelling 135 at level 5, looking NE.

B: Entrance to tunnel 152.

A: Dwelling 155; the upper parts have been demolished.

B: Dwelling 156.

A: Dwelling 108: general view towards the east.

B: Dwelling 108: interior seen towards the west.

ABBREVIATIONS

AAA	Annals of Archaeology and Anthropology
AASOR	The Annual of the American Schools of Oriental Research
'Alon	Bulletin of the Department of Antiquities of the State of Israel
BA	The Biblical Archaeologist
BASOR	Bulletin of the American Schools of Oriental Research
BIES	Bulletin of the Israel Exploration Society, continuing:
BJPES	Bulletin of the Jewish Palestine Exploration Society
BRCI	Bulletin of the Research Council of Israel
CRAI	Comptes-rendus de l'Académie des Inscriptions et Belles-Lettres
EI	Eretz-Israel: Archaeological, Historical and Geographical Studies, published by the Israel Exploration Society
IEJ	Israel Exploration Journal
JNES	Journal of Near Eastern Studies
JPOS	The Journal of the Palestine Oriental Society
PEQ	Palestine Exploration Quarterly, continuing:
PEFQSt	Quarterly Statement of the Palestine Exploration Fund
PJb	Palästinajahrbuch des Deutschen evangelischen Instituts für Altertumswissenschaft des Heiligen Landes zu Jerusalem
QDAP	The Quarterly of the Department of Antiquities in Palestine
RB	Revue biblique
ZDPV	Zeitschrift des Deutschen Palästina-Vereins

MT	Massoretic Text of the Old Testament

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